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(54) APPARATUS FOR HARMONIZING LIGHT

(75) Inventor: **Djuro Koruga**, Beograd (YU)

Correspondence Address:
Joseph A. Fuchs
Rockey, Depke & Lyons, LLC
233 S. Wacker Drive, Suite 5450, Sears Tower
Chicago, IL 60606-6306 (US)

(73) Assignee: **DVB GLOBAL**, Lincolnwood, IL (US)

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(57) **ABSTRACT**

The present invention provides a light filter for converting diffused light to harmonized light having a translucent substrate of glass or plastic; and a coating on the substrate of a fullerene having icosahedral symmetry having a thickness from 10-500 nm.

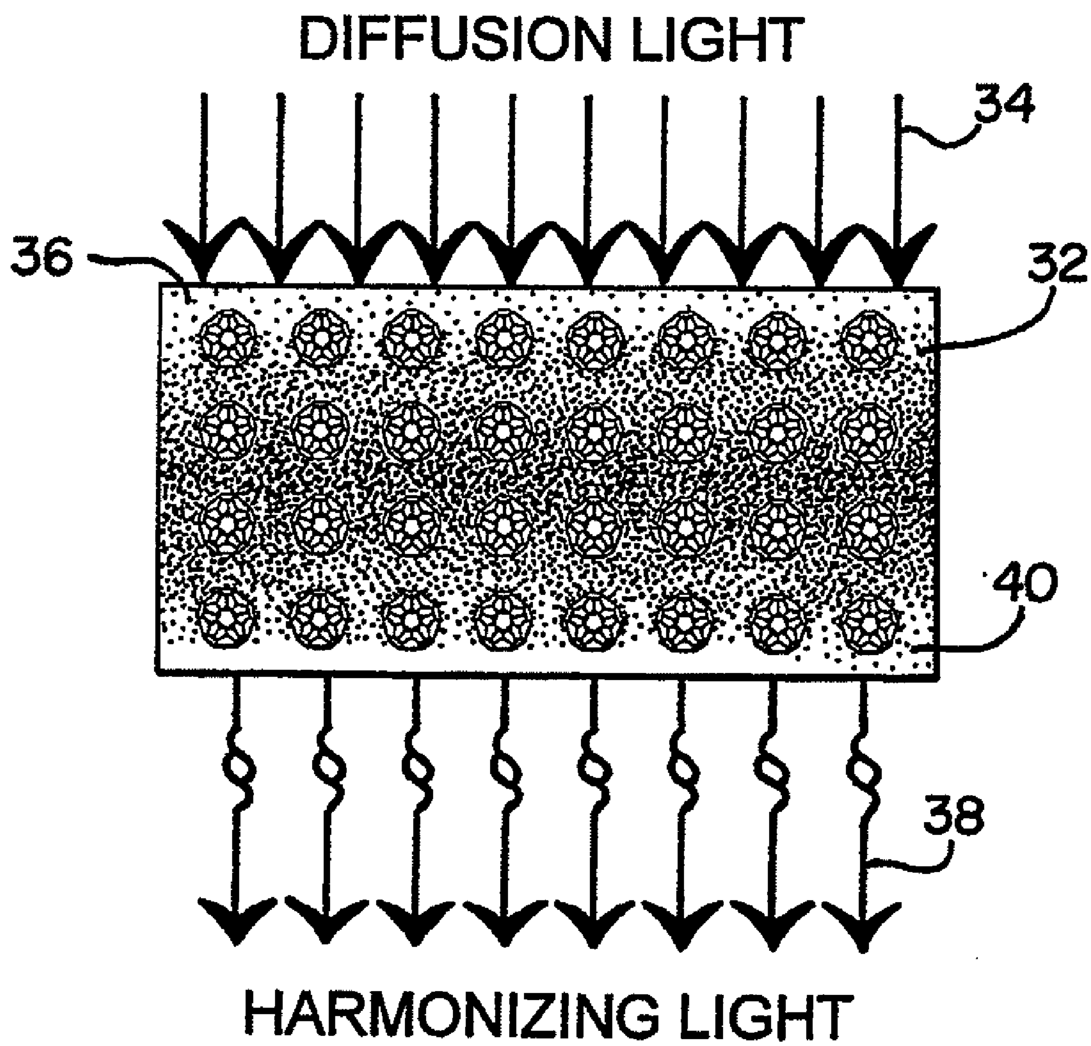


FIG. 1

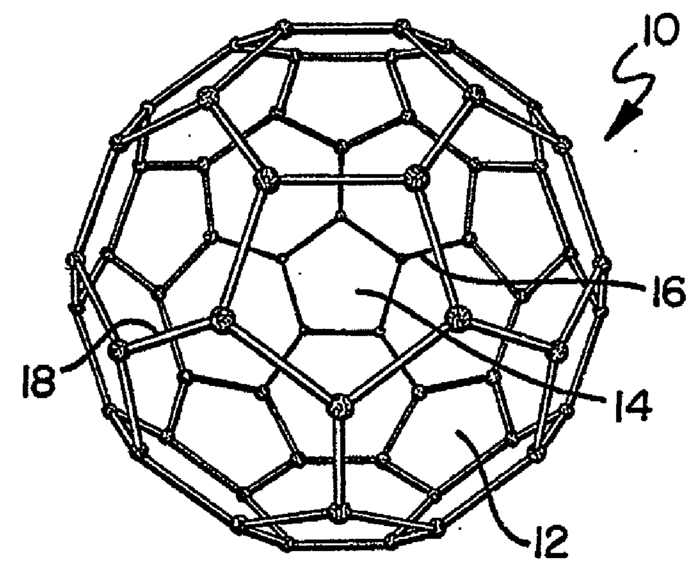


FIG. 2

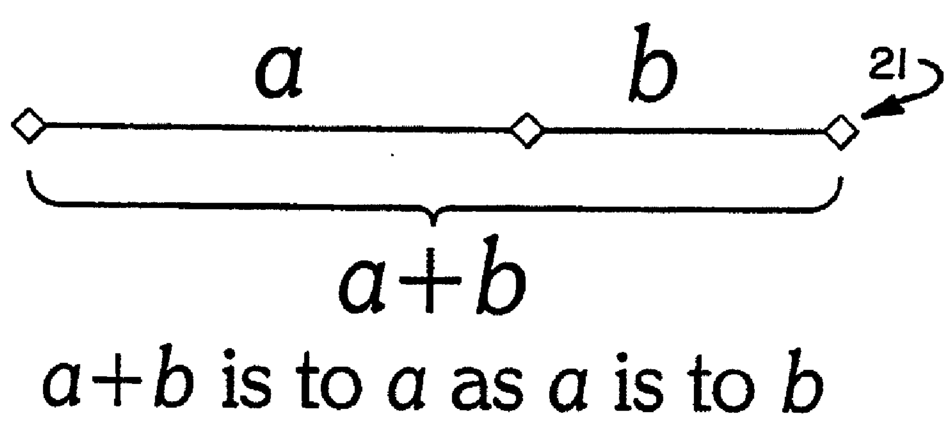


FIG. 3

I/I_h	E	$12C_5$	$12C_5^2$	$20C_3$	$15C_2$	i	$12S_{10}$	$12S_{10}^3$	$20S_6$	15_σ
A_g	1	1	1	1	1	1	1	1	1	1
T_{1g}	3	$1/2(1+\sqrt{5})$	$1/2(1-\sqrt{5})$	0	-1	3	$1/2(1-\sqrt{5})$	$1/2(1+\sqrt{5})$	0	-1
T_{2g}	3		$1/2(1+\sqrt{5})$	0	-1	3	$1/2(1+\sqrt{5})$	$1/2(1-\sqrt{5})$	0	-1
G_g	4	$1/2(1-\sqrt{5})$	-1	1	0	4	-1	-1	1	0
H_g	5	0	0	-1	1	5	0	0	-1	1
A_u	1	1	1	1	1	-1	-1	-1	-1	-1
T_{1u}	3	$1/2(1+\sqrt{5})$	$1/2(1-\sqrt{5})$	0	-1	-3	$-1/2(1-\sqrt{5})$	$-1/2(1+\sqrt{5})$	0	1
T_{1u}	3	$1/2(1-\sqrt{5})$	$1/2(1+\sqrt{5})$	0	-1	-3	$-1/2(1+\sqrt{5})$	$-1/2(1-\sqrt{5})$	0	1
G_{1u}	4	-1	-1	1	0	-4	1	1	-1	0
H_{1u}	5	0	0	-1	1	-5	0	0	1	-1

FIG. 4a

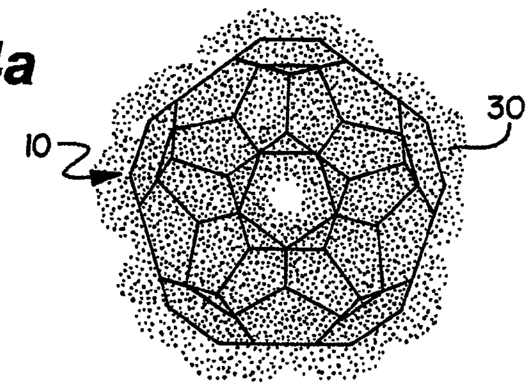


FIG. 4b

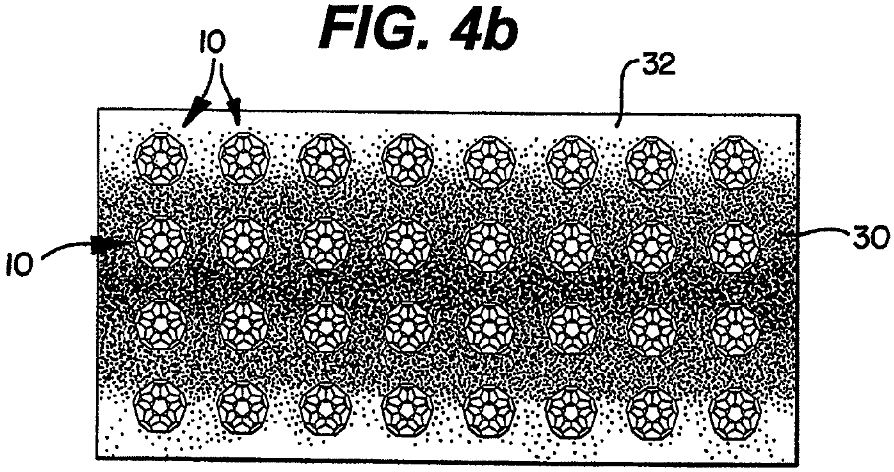


FIG. 4c

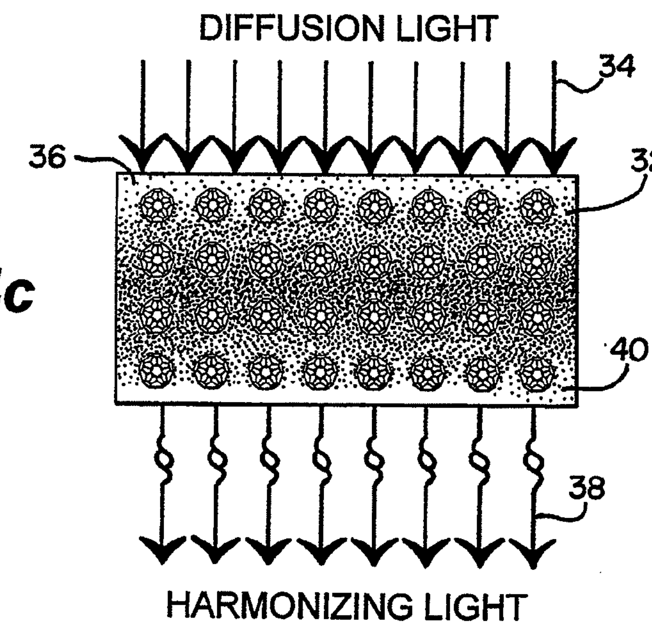


FIG. 4d

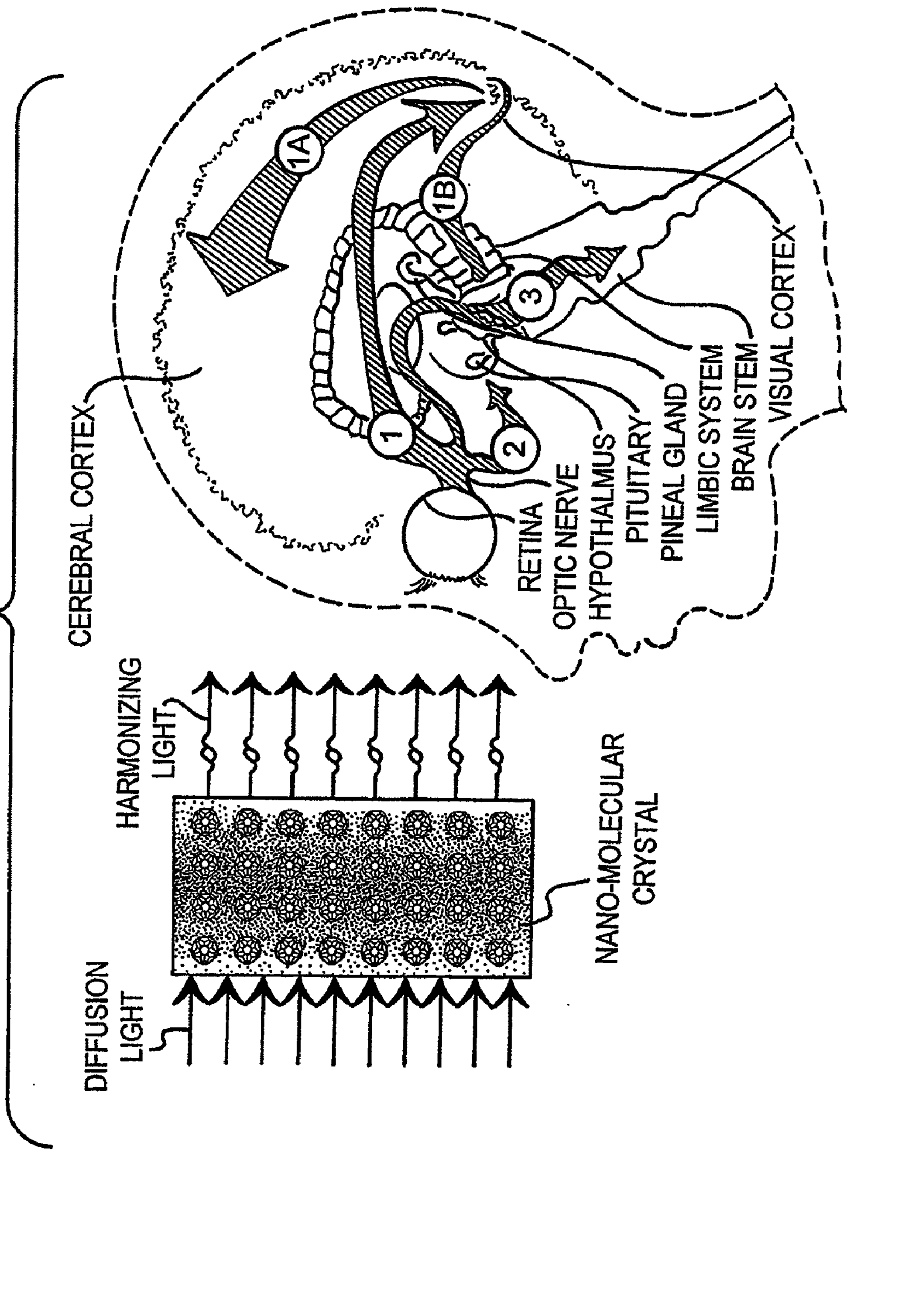

CEREBRAL CORTEX
1A
1B
1
2
3
RETINA
OPTIC NERVE
HYPOTHALMUS
PITUITARY
PINEAL GLAND
LIMBIC SYSTEM
BRAIN STEM
VISUAL CORTEX
HARMONIZING LIGHT
DIFFUSION LIGHT
NANO-MOLECULAR CRYSTAL

FIG. 5a

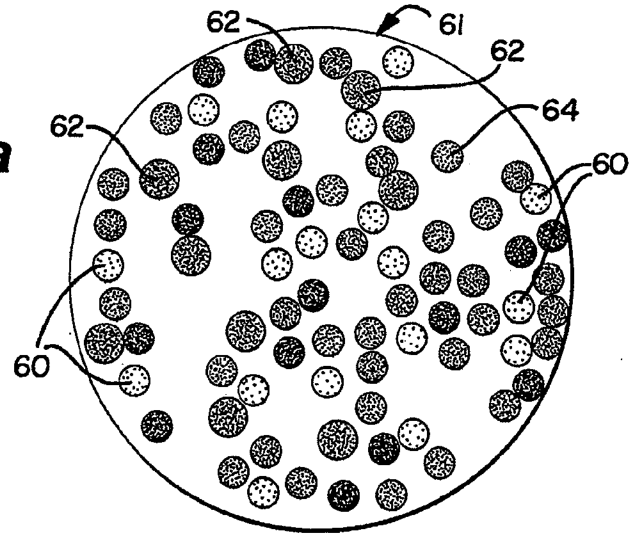


FIG. 5b

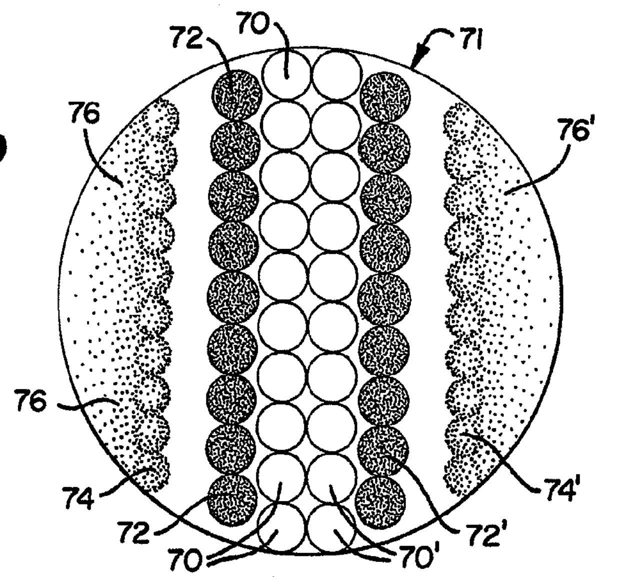


FIG. 5c

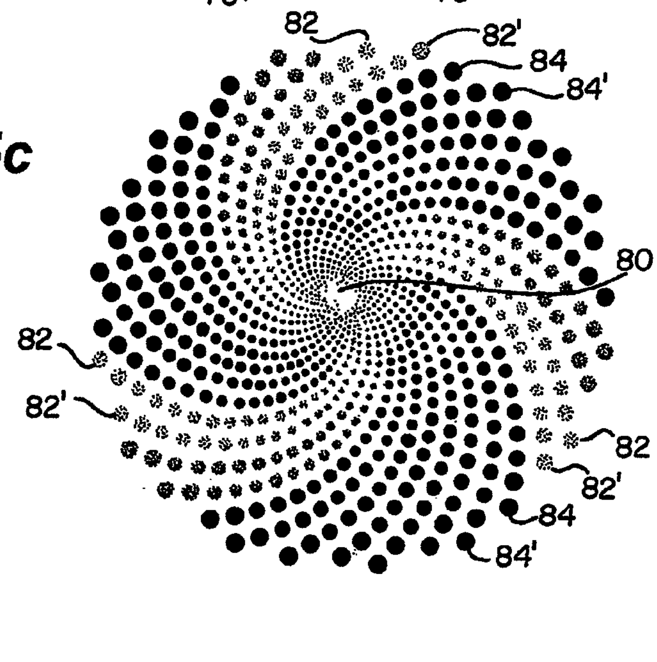
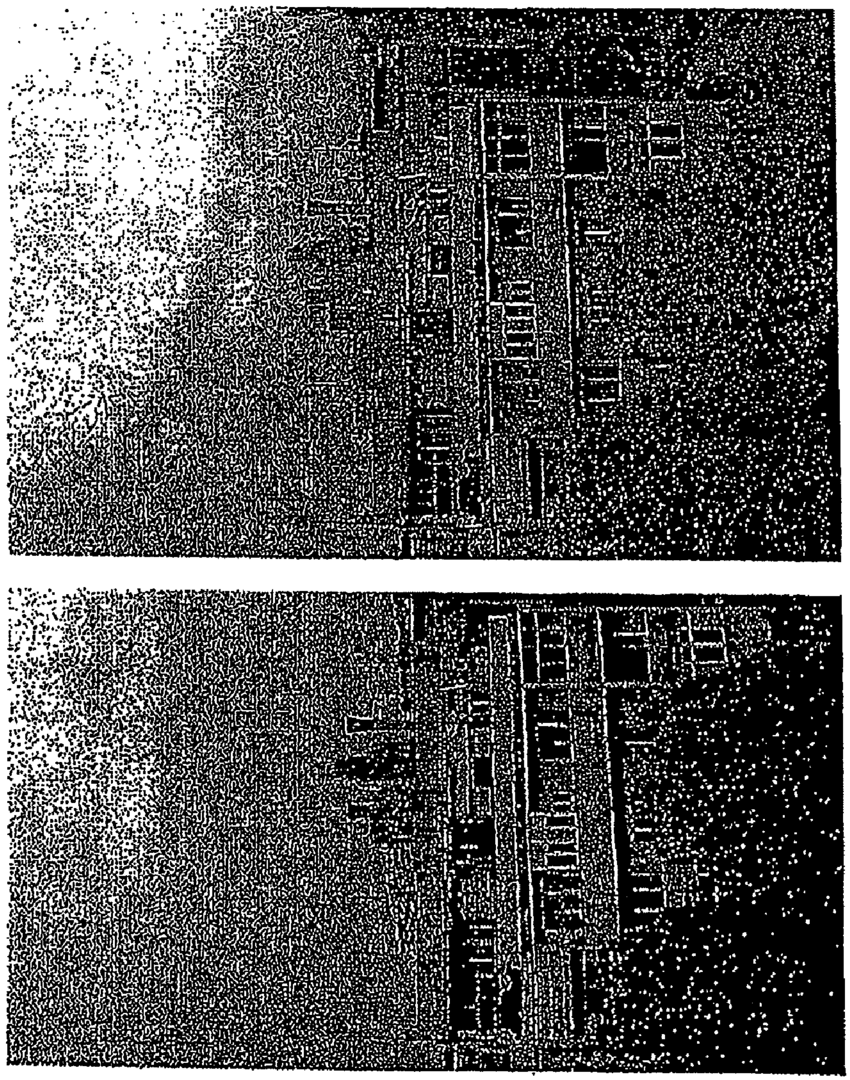


FIG. 6



b.

a.

FIG. 7

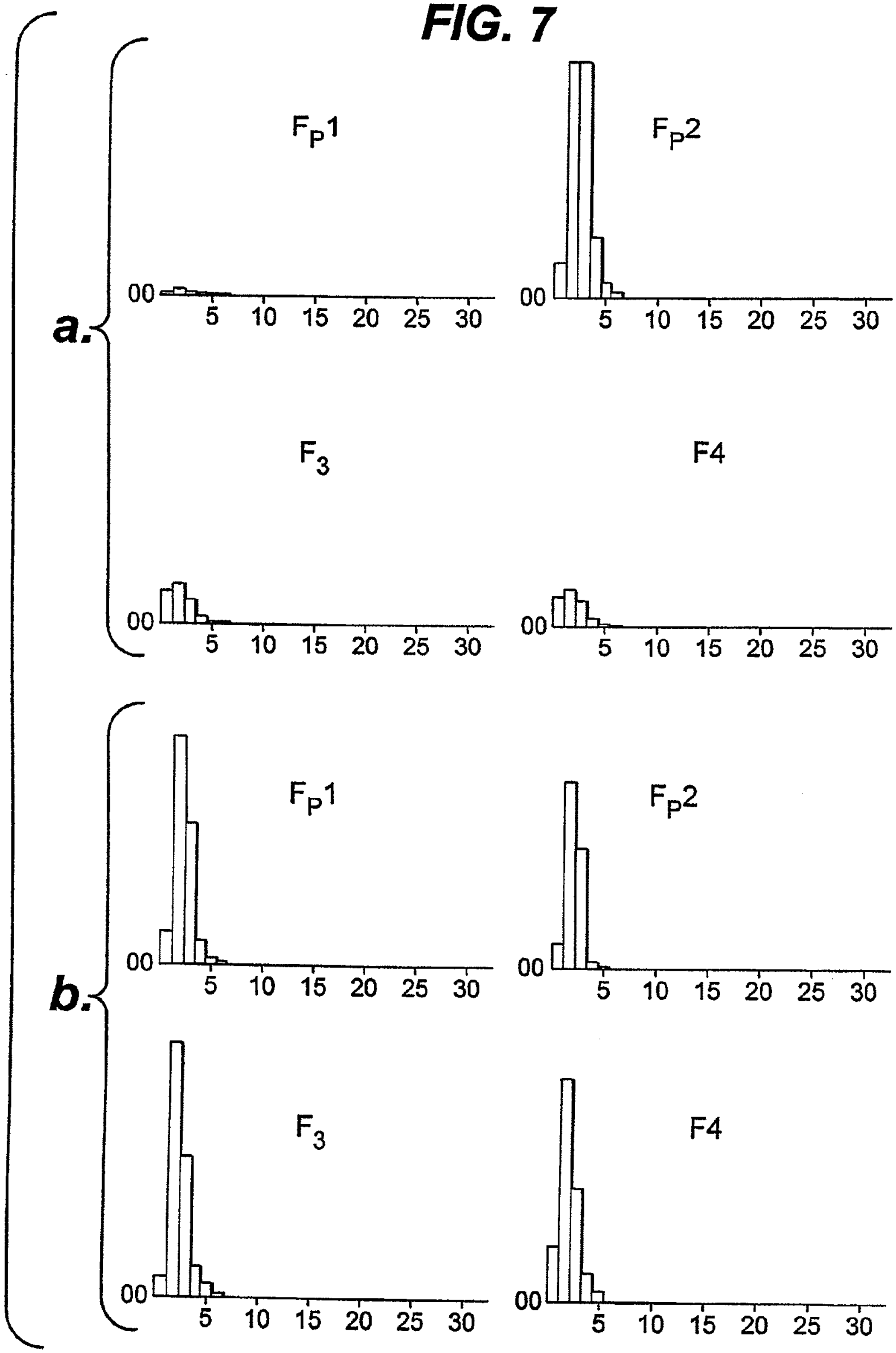
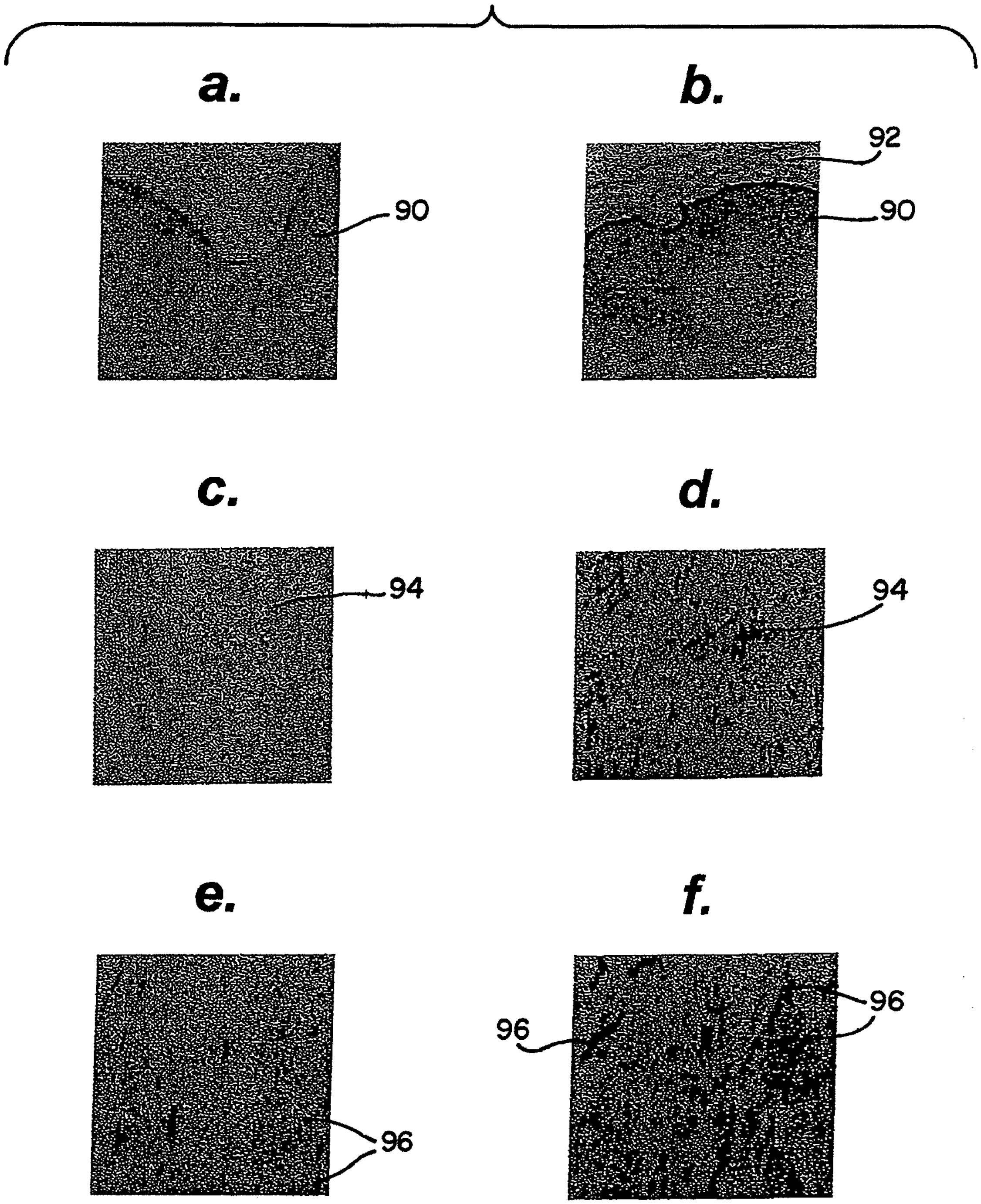


FIG. 8



APPARATUS FOR HARMONIZING LIGHT

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to U.S. Provisional Patent Application No. 60/899,140 filed on Feb. 2, 2007 and U.S. Provisional Patent Application No. 60/959,431 filed Jul. 13, 2007 each of which are incorporated herein by reference and made a part hereof.

FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not Applicable.

BACKGROUND OF THE INVENTION

[0003] 1. Technical Field

[0004] The present invention provides an apparatus for providing harmonized light ("golden light") from sunlight using a filter having a thin film of fullerenes.

[0005] 2. Background Art

[0006] We believe that life on the Earth arose under the influence of sunlight and lightning on water and small molecules, formed from carbon, oxygen, hydrogen, nitrogen, and etc. However, Schrödinger provided a new view on this subject in his book *What is Life*? which has had an enormous influence on the development of molecular biology, stimulating scientists such as Crick and Watson to explore the double helix structure of DNA as the basis of life (Schrödinger **1943**, Watson and Crick, 1953). One of the central points in the book is the statement "that the most essential part of a living cell—the chromosome fiber—may suitably be called an aperiodic crystal" as opposed to a periodic crystal in classical physics. It has been found that DNA works as a classical information system based on a double helix structure and a ternary coding system with $4^3=64$ coding words [Crick, 1963]. Many years later it was recognized that that the genetic ternary code, which codes for amino and imino acids in proteins, also, may be represented as a classical binary code $2^6=64$ [Swanson, 1984, Doolittle, 1981, Rakocevic, 1998].

[0007] DNA may be damaged or stabilized under the influence of light, depending on the photon energy. The longer period of time that DNA is subjected to UV light the greater the possibility for its disorder. Particularly troublesome is if the DNA is exposed to light with a wave length of 307.5 nm. However, tissue stimulation in vivo with waves lengths of 0.2-0.5 mm (with THz frequency, $\sim 10^{12}$ Hz) may help molecular self-assembly of DNA molecules, particularly, and all other biomolecules based on hydrogen bonds, in general. The importance of hydrogen bonding in the structure and function of biological macromolecules was predicted by the earliest investigators (Pauling, Corey, and Branson, 1951). According to Linus Pauling, the first prediction of the existence of a hydrogen bond should be attributed to M. L. Huggins in 1919 and independently to W. M. Latimir and W. H. Rodebush in 1920. Bearing in mind that most biological systems contain water from 60% to 80%, the importance of hydrogen bonds has become most relevant for understanding how biomolecular machinery, as a complex system, works. Within a collection of water molecules, the hydrogen atom is covalently bound to an oxygen atom in the water molecule and hydrogen bonds with oxygen atoms on separate water molecules. It is well known that covalent bond may only be described by quantum mechanics, because each electron does not really belong to a single atom—it belongs to both simultaneously. For a long period of time, scientists believed that the hydrogen bond could be perfectly understood by the principles of electrostatic interactions using Coulomb's law (pre-20^{th} century classical physics), based on the attraction and repulsion between charged particles separated from each other by a distance. However, recent experimental data indicate that a hydrogen bond has double identity: classical and quantum (Isaacs, 1999, Barbiellini, and Shukla, 2003). This is the key point for understanding a new approach to explaining how DNA and proteins function in water. It is believed that water itself may be a coding structure, via its hydrogen bonds, if some water molecules are organized in clusters and some of them are ordered in interconnected chains between water clusters by Fibonacci law. Some local domains of water, under the influence of DNA and microtubules, may be responsible for organizing water molecules into clusters as complementary coding forms. In a human, 40% of it is water is free water, while 60% is captured by biomolecules. Estimates predict that only 5% of free water is in clusters organized by a sphere packing law of coding number **12**. The remaining 95% of free water is in the form of "chaos" with local polymerized islands.

[0008] An understanding of the hydrogen bonding dynamic on quantum chemical scales is useful in the study of biological systems, including the study of diseases such as cancer and medical and cosmetic conditions related to the human skin. By way of background with regard to the human skin, the epidermis is a dynamic renewing structure that provides life-sustaining protection from the environment. Keratinocytes and melanocytes are the major cells types responsible for the structure of the epidermis. They begin as stem cells in the basal epidermal layer. As keratinocytes move to the epidermal surface, the cells cease cell division and undergo morphological changes to form the prickle or spinous cells, granular cells, transition cells, keratinized squames and surface squames. One melanocyte cell may overlap a few keratinocytes giving them melanin (mechanism is yet unknown), which is responsible for protection of the environmental electromagnetic radiation (UV radiation) and neutralization of free radicals (Vami et al, 2004 van den Bossche, at al. 2006).

[0009] Also, collagen distortion below the base level membrane (lamina fibroreticularis) occurs when cancer penetrates through the epidermis into the dermis, and "opens the door" for metastases. From a classical communication channels point of view, gene expression is responsible for it: normal collagen, type I [$\alpha1(I)_2\alpha2(I)$], comprises two procollagen chains, the first $\alpha1(I)$ (gene located on chromosome 17 (q21-q22)), and the second procollagen chain $\alpha2(I)$ (gene located on chromosome 7(q21-q22)). According to quantum theory, quantum communication channels exist among keratinocyte or melanocyte and fibroblast cells (entanglement) based on hydrogen bonding in the DNA. When symmetry-breaking of hydrogen bonds happens in DNA, then automatically, through DNA-microtubule-water coding entanglement, synergy of classical and quantum communication is broken. There is experimental evidence that fibroblast cells and human melanoma cells interact with tumour cell growth as a function of tumour progression (Coinil, at. al. 1991). If UV radiation damages DNA on chromosome 7, in keratinocyte or melanocyte cells, then through non-classical quantum channels this information will transfer to both centriole (damaged cell) and fibroblast cells in the region. The centriole will become "wild" (from bipolar mitosis change to three polar or multipolar mitosis) and will start to divide chromosomes irregularly. The nucleus of an initial cancer cell will grow faster than normal cells. The "wild" cell will be duplicated and rapidly increase in number because positive feedback control mechanism water-centriole will change perpendicularly to centriole pairs (Koruga, et. al. 1992). From another side, fibroblast cells will cease synthesizing collagen $\alpha2(I)$. In the absence of $\alpha2(I)$, procollagen chains during assembly into procollagen molecules, will incorporate an additional $\alpha1(I)$ procollagen chain. This will give collagen type I-trimer with a structure $[\alpha1(I)_3]$. The I-trimer links between procollagen chains do not fit well, and OH groups will be removed from collagen to make free water molecules. The volume of free water will increase from 20% in tissue (Foster and Schwan, 1986). A similar occurrence is observed in skin aging an accounts for the reason for people of advancing age frequently having cancer (Richard, et. al., 2004).

[0010] When this type of collagen becomes dominant in a given tissue, the lamina fibroreticularis (as "a woof" of basal lamina) becomes weak, because the interconnection between procollagen chains in procollagen molecules, based on hydrogen bonds, is not adequate (the electromagnetic shield of a basal membrane has holes). Then, a mass of skin cancer or melanoma, can penetrate the basal lamina and reach the superficial arteriovenous plexus (Brinkley, 2001).

[0011] Hydrogen bonding in biomolecule networks in cell and tissue, as well as their complex intermolecular connections, resemble spider webs. It is a link between classical and quantum behaviour of matter on molecular level, and it is a basic element of synergy between mass-energy and information in living matter.

[0012] DNA is coded by 4^{th} perfect number code $2^n(2^{n+1}-1)$ with 8128 code words, which is responsible for protein coding (classical) and system complexity coding (quantum) by entanglement (Koruga, 2005, Koruga, et al. 2006). There is mapping one-to-one from genetic code to proteins by synergetic code. There is synergetic code (classical/quantum) in protein chain based on amino acids and peptide plains. Hydrogen bonds are links between classical and quantum behaviours of matter on a molecular level, and it is a basic element for synergy of mass-energy-information in living matter.

[0013] Understanding DNA as synergetic classical/quantum device, based on golden mean and the fourth prefect number, may help us not only for better understanding of the origin of life, but also for finding methods for prevention and healing of many illnesses. Bearing in mind that proteins are the second side of DNA code, interaction and communication between DNA and protein may be both through separate classical and quantum communication channels, and through a synergetic one. However, the synergetic approach, which we proposed opens new possibilities for therapy of many skin illnesses including cancer.

[0014] These and other aspects and attributes of the present invention will be discussed with reference to the following drawings and accompanying specification.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] FIG. **1** is a diagrammatic view of a C_{60} fullerene molecule;

[0016] FIG. **2** is a diagrammatic representation of a Golden Mean Rule in one dimension;

[0017] FIG. **3** is a multiplication table of the energy-symmetry relationship for icosahedral group with golden mean ratio for T_1, T_{2u}, T_{1g} and T_{2g} energy states and C_5, C_5^2, S_{10} and S_{10}^3 symmetries;

[0018] FIG. **4***a* is a diagrammatic representation of a cluster of π-electrons (electron cloud) of a C_{60} in the ground state;

[0019] FIG. **4***b* is a diagrammatic view of a C_{60} thin film showing a π-electron cloud;

[0020] FIG. **4***c* is a diagrammatic representation of a C_{60} thin film showing a π-electron cloud in an excited state resulting from the input of diffused light energy on one surface of the thin film structure and an output of harmonized light from an opposite surface of the film structure;

[0021] FIG. **4***d* is a diagrammatic representation of a harmonized light pathway passing through the eyes of a human subject, then through the optical nerve to the hypothalamus and finally the visual cortex;

[0022] FIGS. **5***a-c* are diagrammatic representations of diffusion light, polarizing light and harmonizing light, respectively;

[0023] FIGS. **6***a,b* are photographs taken by a digital camera without a filter and with a harmonized glass filter respectively;

[0024] FIGS. **7***a,b* are EEG plots before and after exposure of a subject to harmonized light;

[0025] FIGS. **8***a,b* are photographs of an epidermis of a human subject before and after exposure to harmonized light;

[0026] FIGS. **8***c,d* are photomicrographs (1 cm=50 μm) of collagen before and after exposure of a human subject to harmonized light, respectively; and

[0027] FIGS. **8***e,f* are photomicrographs 1 cm=50 μm of elastin before and after exposure of a human subject to harmonized light, respectively.

DETAILED DESCRIPTION OF THE INVENTION

[0028] While this invention is susceptible of embodiment in many different forms, there is shown in the drawings, and will be described herein in detail, specific embodiments thereof with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the specific embodiments illustrated.

[0029] FIG. **1** shows a C_{60} fullerene **10** composed entirely of carbon atoms in the form of a hollow sphere in the shape of the familiar black and white soccer ball (Telestar 1970) and has icosahedral symmetry (I_h). Fullerenes comprise a family of carbon allotropes containing from 20 to 1000 or more carbon atoms in each cage-like structure. The structure of C_{60} fullerene is a truncated icosahedron having 20 hexagon faces **12**, 12 pentagon faces **14**, all single bonds along pentagon perimeters **16**, one double bond **18** and 2 single bonds per carbon atom. Accordingly, the icosahedral C_{60} fullerene will sometimes be referred to as $(C_{60}-I_h)[5,6]$ fullerene. Other suitable fullerenes have the formula $(C_X-I_h)[5,6]$ fullerene where X is a number of carbon atoms which allow for the cage to have icosahedral symmetry and include but are not limited to 80, 140, 180, 240, 260 320, 380, 420, 500, 540, 560, 620, 720, 740, 780, 860, 960, and 980.

[0030] The C_{60} has two bond lengths. A first bond length is along the edges of two hexagons and the second bond length is between the edge of a hexagon and a pentagon, the first bond length being greater than the second bond length. One of the crucial properties of the fullerene C_{60} is the energy states of T_{1g}, T_{2g}, T_{1u} and T_{2u} for symmetry elements C_5, C_5^2, S_{10}

and S_{10}^3 are consistent with the golden mean (FIG. **3**). (Koruga, et. al., 1993, Dreselhaus, et al., 1996). Since, the symmetry properties of the structure is determinate of its vibration and rotation energy states, it has been shown that integral energy (translational, vibrational, rotational and electronic) states of fullerene C_{60} follows the golden mean rule or ratio (Harter, 1989).

[0031] FIG. **2** shows a figural representation **21** of the golden mean rule or golden ratio. The golden ratio usually designated with the symbol Φ and expresses the relationship that the sum of two quantities is to the larger quantify as the larger quantify is to the smaller quantity, that is a+b is to a as a is to b. The golden ratio can be expressed mathematically as:

$$\Phi=\pm(1+\sqrt{5})/2\approx\pm 1.618033$$

[0032] The conjugate golden ratio $\phi=\pm 1/\Phi\approx\pm 0.618$ corresponds to the length ratio taken in reverse order b/a.

[0033] FIGS. **4***a,b,c* show the electron cloud **30** of a π-electrons of carbon atoms of a fullerene **10** in different states. FIG. **4***a* shows the electron cloud **30** of a fullerene **10** in a ground, unexcited, state. FIG. **6***b* shows a plurality of fullerenes forming a thin film **32** on a suitable translucent substrate such as glass or plastic with the electron cloud **30** of hydrogen atoms in an unexcited state. FIG. **4***c* shows the thin fullerene film **32** exposed to diffused light **34** striking a first surface **36** of the film and being converted to harmonized light **38** as shown upon exiting an opposed second surface **40** of the thin film.

[0034] What is meant by the term diffused light is light where the photons of varying wave lengths are randomly ordered (FIG. **5***a*). FIG. **5***a* represents light of varying through a lens **61** wavelengths with different sized and gray scale dots. A plurality of light colored dots **60** represent photons of light of one frequency and similarly different shades and different sized dots **62** and **64** represent photons of light of different frequencies from each other and from dot **60**. The photons are randomly distributed over a surface of the lens **61**, and, therefore, by definition represents diffused light.

[0035] FIG. **5***b* represents polarized light with photons of the same first frequency **70** frequency are aligned in a straight line across the lens **71** are in a single plane and a mirror image plane **70**'. Light of different frequencies **72**, **74**, and **76** are of differing wavelengths each aligned along a single plane, and mirror image plane designated with a prime ('), with each plane parallel to one another.

[0036] FIG. **5***c* shows a representation of harmonized light. The term harmonized light is meant to refer to light where photons of different wave lengths (energy) are ordered by the golden mean law. Photons of numerous different wavelengths each emanate from a central point **80** and rotate clockwise in the form of a golden spiral (e.g., **82**, **84**, etc.) (with mirror image spirals designated with a prime (')). Each wavelength will have three spirals circumferentially spaced by 120° because the golden ratio in two dimensions obeys the equation $\phi^2+\Phi^2=3$. A golden spiral is one that gets wider or further from the center point **80** by every quarter of a turn by a factor of Φ=2/1, 3/2, 5/3, 8/5, 13/8, etc. Harmonized light would also include golden spirals that rotate counterclockwise in accordance with ϕ but these spirals are not shown for the sake of clarity. Harmonized light can be said to be hypopolarized light as photons of equal wavelength are lineararly polarized light (in plane) and are circularlary polarized in circles in such a way that linear-circular ratio by wave lengths (energy) are both ϕ and Φ.

Harmonized Fullerene Light Filter

[0037] Since 1990, the optical properties of molecules C_{60} in solution, thin film and crystal states has been investigated and well summarized in the literature (Dreselhaus, 1996). However, until now no one investigator has paid serious attention to its optical golden mean properties. One of the clearest features in a regular, periodic optical crystal is the photonic band gap, which is similar to the electronic band gap in semiconductors. However, under influence of light, samples, which consists of multilayer dielectric structures of the golden mean (1D quasicrystal), also generate mode beating and pulse stretching with strongly suppressed group velocity for frequencies close to a Fibonacci band gap (Dal Negro, 2003). Consideration of this phenomena based on transfer matrix theory suggest the existence of Fibonacci band-edge resonance. As discussed above in reference to FIG. **2**, the ratio of successive terms in the Fibonacci sequence (0, 1, 2, 3, 5, 8, 13, 21, 34 . . .) trends to the golden ratios, which is Φ=1.61803 when the ratio is calculated from bigger to smaller values of sequence (34/21, 21/13, . . .), or the inverse is ϕ=0.61803 when the ratio is calculated from smaller to bigger value of sequences (21/34, 13/21, . . .). One example in nature of the golden ratio include a golden triangle which is defined by the equation $\Phi^2+\phi^2=3$, which provides a mathematical model of human brain functionality.

[0038] The brain memory span—the link between psychometric intelligence and cognition—could be understood as a superposition of n harmonics times 2Φ, where half of the fundamental is the golden mean as the point of resonance. The brain wave packets are ordered by the golden mean and may be very well understood as bifurcations which occur at the edge of chaos by relation $2\Phi=3+\phi^3$ (Weiss, 2003).

[0039] We tested the resonance capability of the golden mean as an influence of Fibonacci type optical spectrum to the brain. In order to do that we employed a fullerene C_{60} as a Fibonacci type structures (OD quasi-crystals) and its effects on the biomolecule clathrin, which is present in the synapses in the human brain. We assume, if resonance exists between the clathrin molecule and the fullerene C_{60} then the optical transmission spectrum of C_{60} will have an influence on the clathrin functionality that is measurable using an EEG signal taken from a human being exposed to optical transmission.

[0040] To make a prototype of a nanophotonic glass we deposited fullerene C_{60} onto a planar surface of a sheet of transparent white floatglass (PGO, Germany) to form a thin film of the fullerene C_{60} on the glass (FIGS. **4***b,c*). The precursor powdered C_{60} was acquired from Materials and Electrochemical Research (MER) Corporation, USA with purity of 99.95%. The glass had following characteristics: 1.1 mm thickness, refractive index 1.52 on 587.6 nm, coefficient of thermal expansion 84×10^{-7} through a temperature range of 0-300° C., a dielectric constant 7.75 on 25° C. and 1 MHz, specific resistivity 9.7 [log R (Ωcm)] and transparence of 92% in range of wavelength 380-2500 nm. To deposit the thin film of the fullerene C_{60} we used a vacuum deposition technique carried out with a Vacuum Evaporator JEE-400 (JEOL, Japan) with a vacuum of about 10^{-5} Pa in a bell-jar with a diameter of 240 mm and h=270 mm. The bell-jar envelopes two pairs of electrodes; one pair of electrodes is fitted with a pair of heater holders and the other pair of electrodes is fitted with a pair of fullerene holders. Vacuum pressure is accurately measured by a built-in Penning and Pirani gauge. After deposition of thin films on the white floatglass samples they were covered by white floatglass and fixed on edges to protect from air influence to form harmonized filters **32**. The thickness of the fullerene C_{60} film **32** was about 62 nm although it is contemplated the film could have a thickness from about 5 to about 500 nm, and more preferably from about 30 to about 100 nm. Sample rotation (0°, 90°, 180°, 270°), i.e., polarization plane rotation in N-S and W-E plane, did not show any changes in magnetic field intensity, which indicates that the samples were homogeneous.

[0041] A pair of harmonized filters **32** were mounted into a pair of eye glass frames with one harmonized filter mounted into separate eye glass frames for each eye to form a pair of harmonized eye glasses. These glasses were worn by subjects to provide harmonized light to the eyes of a subject wearing the glasses.

[0042] In our experiment we choose four measuring loci on the human head to place separate EEG electrodes. During normal brain function the EEG signals from each electrode (Fp**1**, Fp**2**, F**3**, F**4**) should be roughly the same in terms of amplitude. Since the clock cycle of the human brain waves obey the golden ratio (Weiss, 2003), we expect in our experiment that on all four measuring positions (Fp**1**, Fp**2**, F**3**, F**4**) the power intensity will change under the influence of exposure to harmonized light. We made twelve measurements, before and after the patient's eyes were exposed for 10 minutes to the diffusion of sun light and Harmonized Light, respectively. Experiments were carried out under standard clinical procedure at the Medical School, University of Belgrade and Hospital of Military Academy—VMA, Belgrade). Results strongly indicate that there are objective (EEG signals) and subjective (patient statements) differences.

[0043] Proper human brain function is indicated when the EEG signals from locations Fp**1**, Fp**2**, F**3**, F**4** are of the same frequency and amplitude. A human subject was first exposed to sunlight and his or her EEG signals were measured in the four locations and the results of the EEG signals are shown in FIG. **7***a* with the X axis plotting frequency in Hz and the Y axis plotting frequency in units of microvolts squared over Hz or $\mu V^2/Hz$. The EEG signals received from the four electrode locations were substantially different from one another as can be seen in the plots. According to PET (Positron Emission Tomography) the brain activity on Fp**1**, Fp**2**, F**3**, F**4** locations should be the same when the human subject views a complex scene. Further, three of the electrodes (Fp**1**, F**3**, and F**4**) showed low activity and while only one signal, Fp**2** showed a good response.

[0044] Next, the human subject wore the pair of harmonized eye glasses and after 10 minutes of exposure to harmonized light the EEG readings showed a substantial positive improvement. All four EEG signals were very similar and were of the desired amplitude.

[0045] From a subjective standpoint patients with this brain state explained that before the experiment they were a little depressed, while now they feel better, in a sense relaxed.

[0046] We conducted further experiments by fitting a digital camera with the harmonized filter. We took photographs without (FIG. **6***a*) and with the harmonizing filter covering the lens of the camera (FIG. **6***b*) during cloudy weather. We found out that the photograph taken with the harmonizing filter appeared brighter (FIG. **6***b*). Without wishing to be bound by any theory, we believe the improvement in EEG signals and the subjective mood of the subjects was due to the harmonized light's effect on the serotonin/melatonin regulation by exposure to the harmonized light.

[0047] Experiments were also conducted to determine the potential effects on the health of human skin by exposing the skin to harmonized light. Twelve human subjects were tested over a two month period in the Department of Dermatology in the School of Medicine, University of Belgrade. Each subject was exposed to harmonized light three times per day for ten minutes session over the two month period. A comparison of measurements of the epidermis of the human subjects taken before and after the exposure to harmonized light (FIG. **8***a,b*) showed the epidermis had a more healthful structure richer in keratinocyte cells **90** and melanocyte cells **92** in terms of the number of these cells per square area increased by 60% after exposure as determined through standard histological cell counting techniques of a biopsy.

[0048] FIGS. **8***c,d* are photomicrographs showing an increase in the number of collagen cells **94** in a representative subject's skin comparing the number of collagen cells per square area counted at a time before a treatment (FIG. **8***c*) and after the treatment by exposure of the skin to harmonized light (FIG. **8***d*). The photomicrograph was taken with a transmission electron microscope under 200,000 magnification. Tests results showed an increase in the number of collagen cells **94** per square area from 55%-65% in three cases, 65%-75% in seven cases, and more than 75% in two cases.

[0049] FIGS. **8***e,f* are photomicrographs showing an increase in the number of elastin cells **96**, in terms of the number of cells per square area, counted before (FIG. **8***e*) and after a treatment by exposure of a representative subjects' skin to harmonized light. The photomicrographs were taken with a transmission electron microscope under 200,000 magnification. The number of elastin cells increased in an amount from about 48% to about 52% depending on the subject tested. The increase in elastin cells showed an increase in the length of the structures formed from the cells and an improved organization of the cells.

[0050] Not wishing to bound to any particular theory, it is believed the harmonized light had a positive impact because fibroblasts have a clathrin coating. Clathrin is meant to refer to a protein complex of three large polypeptide chains and three smaller polypeptide chain to form a triskelion structure The triskelion structures assemble into structures having icosahedral symmetry (with diameters 120 nm), and, therefore, a resonant energy of the harmonized light interacts with a conformation energy state of clathrin.

[0051] It is contemplated that the harmonized filters **32** could be used to filter numerous light sources such as from incandescent light bulbs, fluorescent light bulbs, LEDs, LCDs and other sources of light. The incident light can be diffused light, or polarized light as discussed above with reference to FIGS. **5***a,b,c*. For example a standard fluorescent light fixture having a diffuser element as is commonly present in office lighting fixtures could be replaced by a harmonized filter **32** to provide healthful, harmonized light to persons exposed to the harmonized light.

[0052] From the foregoing it will be observed that numerous variations and modifications may be effected without departing from the spirit and scope of the invention. It is to be understood that no limitation with respect to the specific inventions disclosed herein is intended or should be inferred. It is, of course, intended to cover by the appended claims all such modifications as fall within the scope of the claims.

What is claimed is:

1. A light filter for converting light to harmonized light comprising:
a translucent substrate of glass or plastic; and
a coating on the substrate of a fullerene having icosahedral symmetry having a thickness from 10-500 nm.

2. The light filter of claim **1** further comprising a light filter positioned in an eye glass frame.

3. The light filter of claim **1** further comprising two light filters one of each positioned in separate frames of a pair of eye glass frames.

4. The light filter of claim **1** wherein the fullerene has the formula $(C_X\text{–}I_h)$[5,6] fullerene and X is a number is 20, 60, 80, 140, 180, 240, 260 320, 380, 420, 500, 540, 560, 620,720, 740, 780, 860, 960, and 980.

5. The light filter of claim **4** wherein fullerene has the formula $(C_{60}\text{–}I_h)$[5,6] fullerene.

6. A method of forming a light filter for converting light to harmonized light comprising:
providing a translucent substrate of glass or plastic;
depositing a coating of a fullerene having icosahedral symmetry onto a surface of the substrate to form a layer having a thickness from 10-500 nm.

7. The method of claim **1** wherein the step of depositing a coating comprises a vacuum deposition technique.

8. A method for increasing the content of collagen in human skin comprising:
providing a light filter having a translucent substrate of glass or plastic, and a layer on the substrate of a fullerene having icosahedral symmetry having a thickness from 10-500; and
directing a source of light through the light filter onto the human skin for an effective period of time.

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