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(54) **Title:** METHOD AND APPARATUS FOR MULTIMODAL IMAGING OF BIOLOGICAL TISSUE

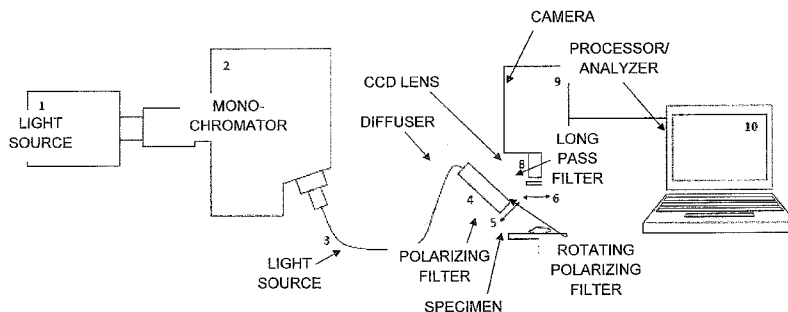




FIG. 1

(57) **Abstract:** The present invention is directed to a novel multi-wavelength imaging method and apparatus that enables rapid imaging of tissue regions with accurate identification of tissue types within the region. Optical properties, such as co-polarized or cross-polarized fluorescence or reflectance intensity, optical density and/or reflectance, can be determined at a plurality of locations within the tissue region for each wavelength. Said properties at the two wavelengths, including calculated derivatives of the optical property with respect to wavelength, can be analyzed to image tissue structures and identify tissue types within the tissue region more accurately than can be achieved based on properties measured at a single wavelength.

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## INTERNATIONAL SEARCH REPORT

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<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
<i>G01N 21/25(2006.01)i, G01N 33/483(2006.01)i, G01N 21/64(2006.01)i</i>		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols) G01N 21/25; G02B 21/18; A61B 5/00		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Korean utility models and applications for utility models Japanese utility models and applications for utility models		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) eKOMPASS(KIPO internal) & Keywords: tissue,imaging,multimodal,wavelength		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	MUNIR Y. AL-ARASHI et al., `Multimodal Confocal Microscopy For Diagnosing Non melanoma Skin Cancers`, Lasers in Surgery and Medicine 39:696-705, 2007 See Pages 1-3 and Figure 2	1-4,7-9,13,14,21,22,24,25,28-30,37,38
A	US 6280386 B1 (ALFANO; ROBERT R. et al.) 28 August 2001 See Figures 2,8,13 and related descriptions	1-38
A	US 2008-0024860 A1 (ANNA M. YAROSLAVSKY et al.) 31 January 2008 See Figure 1 and related descriptions	1-38
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
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Name and mailing address of the ISA/KR  Korean Intellectual Property Office Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140		Authorized officer JEONG JI Deok Telephone No. 82-42-481-8420 

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Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6280386 B1	28.08.2001	None	
US 2008-0024860 A1	31.01.2008	EP 2041613 A2	01.04.2009
		EP 2041613 A4	07.04.2010
		US 2008-024860 A1	31.01.2008
		WO 2008-005402 A2	10.01.2008
		WO 2008-005402 A2	10.01.2008
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