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CIGARETTE WRAPPERS

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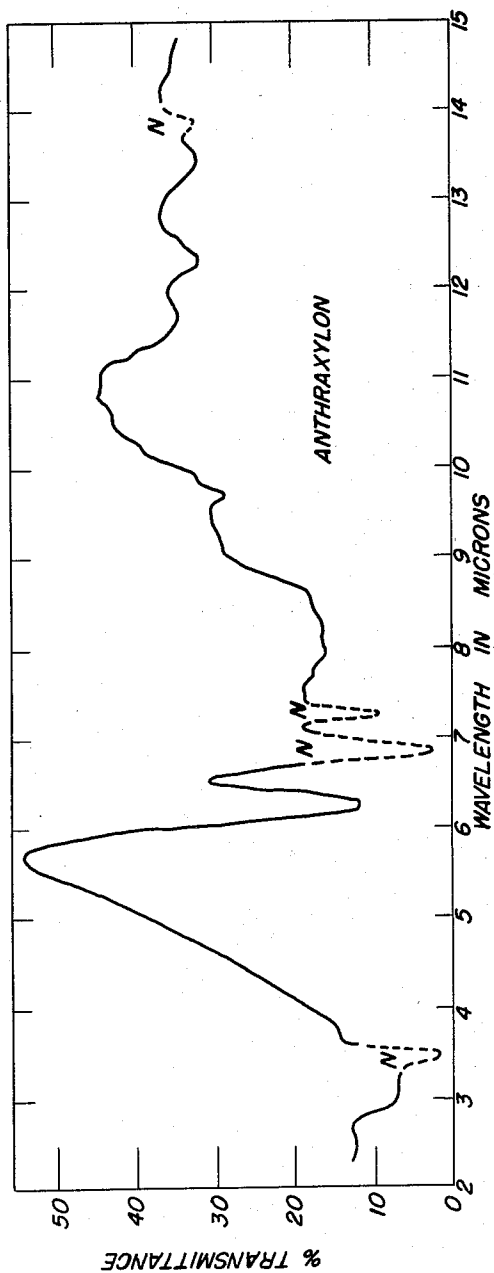


FIG. 1

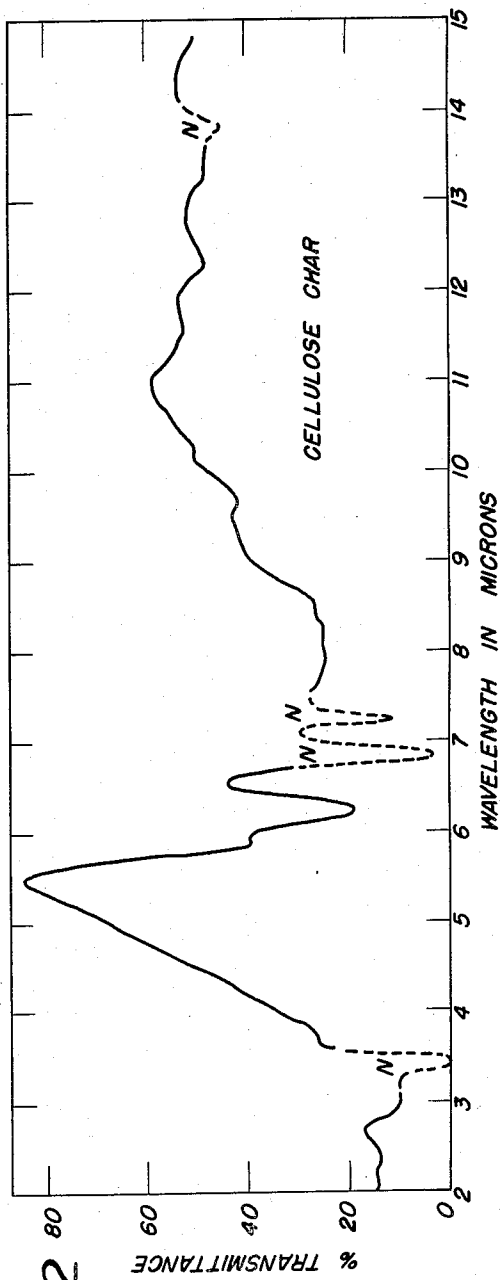


FIG. 2

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CIGARETTE WRAPPERS

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8 Claims. (Cl. 131-15)

This invention relates to wrappers for cigarettes and, more particularly, to novel wrappers for cigarettes comprising a non-cellulosic material.

Cigarettes, as is well known, usually are prepared from tobacco shreds in rod-like form, surrounded or encased in paper. During the smoking of a cigarette, the burning tip obtains a temperature averaging as high as 440° C. and the combustion temperature of the cigarette in the combustion zone thereof attains an average as high as 680° C. In studies involving the charring of materials such as cellulose which contain a carbonyl group, it has been found that the materials are converted to chars closely resembling coal. This is illustrated by Figs. 1 and 2, which show infrared spectra of chars obtained by the pyrolysis of cellulosic material and of the anthraxylon or the main constituent of coal. The similarity of the spectra of coal and of chars obtained from the pyrolysis of cellulosic material shows that the charring of the cellulose results in polycyclic structures which yield polynuclear aromatic hydrocarbons upon further pyrolysis. Inasmuch as cellulose upon charring results in polynuclear structures which decompose to produce compounds such as phenanthrene, anthracene, and other derivatives, the use of cellulosic materials to manufacture cigarette paper wrappers introduces a source of carcinogenic compounds into the cigarette smoke.

After the stalks and stems have been removed from the tobacco during the processing of the tobacco for the formation of cigarettes, substantially all of the cellulosic materials have been removed therefrom. Thus, when cigarette paper wrappers consisting of cellulosic materials are employed in the manufacture of the cigarette, the greater percentage of the cellulosic material present in the total cigarette resides in the wrapper. The wrapper in this instance may constitute as much as 80% of the total cellulosic material present in the cigarette. At the temperatures obtained during the burning of the cigarette, the cellulosic material forms chars which are a source of carcinogenic compounds. While it has been shown that extended periods averaging as long as 30 to 35 years are often required for the production of certain types of carcinoma to be developed as a result of cigarette smoking, it is nevertheless desirable to remove any known source of carcinogenic compounds from cigarettes.

It has been determined that carbohydrates containing a carbonyl group such as glucose or cellulose will yield upon pyrolysis six-membered carbon-ring structures in the residue as a result of oxidation. The wrappers to be employed in accordance with the present invention are derived from non-cellulosic materials, preferably non-cellulosic material free of carbonyl groups. It is further desired that the wrappers to be employed consist of a polymer of a non-cellulosic material comprising only carbon and hydrogen atoms and free of carbonyl groups. Such materials that may be used are, for example, polyethylene, polystyrene, styrene-butadiene copolymers and

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the like. Other non-cellulosic polymers capable of being formed into films or sheets and thus suitable for the production of the cigarette wrappers will be apparent to those skilled in the art. Obviously, toxic groups or groups capable of forming toxic derivatives should not be employed in the production of the wrappers. As previously indicated, carbonyl groups must not be present inasmuch as six-membered carbon-ring structures will be formed during pyrolysis of the material. Other groups that will readily be apparent and should be omitted are such as the halogens and groups that are potentially carbonyl forming.

As is well known, polyethylene polymers are odorless, tasteless, non-toxic and transparent. These polymers may be formed by a plurality of different methods. For example, the polyethylene polymer may be prepared by polymerizing ethylene in the gaseous phase by contacting same in the presence of a catalyst over very wide temperature ranges and under pressures of at least 500 pounds per square inch. If desired, the ethylene may be contacted by a moving catalyst or passed through a fixed or fluid bed of the catalyst. Other methods may also be employed for forming the polyethylene polymer as, for example, by carrying out the polymerization in an aqueous medium in the presence of a peroxide catalyst and at extremely high pressures. Polyethylene polymers thus formed may then be treated by methods well known in the art for the production of films or sheets suitable for use as wrappers in the production of cigarettes.

Other polymers of non-cellulosic materials that may also be employed are such as styrene-butadiene copolymers. These polymers are usually prepared by the emulsion polymerization of the monomers in the presence of a catalyst and suitable wetting agents. The copolymers thus formed may then be treated or compounded, as is well known, for the production of films or sheets suitable for the preparation of the cigarette wrappers. Any other non-cellulosic material and preferably the polymer of any non-cellulosic material containing carbon and hydrogen atoms and free of carbonyl groups that may be apparent, in view of the teaching of my invention, may also be employed. Obviously, the material to be employed for the preparation of the cigarette wrappers must be capable of forming films. Since non-cellulosic materials are utilized in the preparation of cigarette wrappers in accordance with the present invention, a known source of carcinogenic compounds is thus removed from the cigarette. Inasmuch as no carbohydrates containing carbonyl groups are present in the cigarette wrappers of my invention, condensed polycyclic structures will not be formed from the wrapper. The pyrolysis product of the wrapper will be free from tarry vapors, more nearly odorless and tasteless and will enhance the odor and taste of the product from the tobacco.

The nature of the invention will be more fully apparent by reference to the drawing comparing the infrared spectra of anthraxylon, Fig. 1, and that of cellulose, Fig. 2. In preparing the pyrolysis product of anthraxylon and cellulosic material for analysis, each of the chars is finely disintegrated and mixed with Nujol, a liquid petrolatum. The fact that these spectra are identical in almost every detail throughout the whole infrared region is strongly indicative that the cellulose char material is made up of essentially the same type of infrared absorbing chemical groups as are in the anthraxylon, which is a main constituent of coal. For example, the band near 3 microns is indicative of compounds containing the OH group and the band near 6.25 microns is indicative of conjugated or aromatic $C=C$ compounds.

As produced, the films or sheets of the polymers of the non-cellulosic materials containing carbon and hydrogen atoms and free of carbonyl groups are generally transparent. If desired, nontoxic colorants or dyes may be introduced into the wrappers to produce the conventionally accepted white color of the cellulosic cigarette wrappers presently employed in the industry. Other compounds may also be introduced into the cigarette wrappers of the present invention, if desired, in order to obtain the desired porosity and the like of the wrappers. In any event, the cellulosic paper wrappers previously employed for the production of cigarettes will be replaced by my invention with a non-cellulosic wrapper.

I claim:

1. As a wrapper for a cigarette, a non-cellulosic material comprising hydrogen and carbon atoms and free of carbonyl groups.

2. As a wrapper for a cigarette, a polymer of a non-cellulosic material free of carbonyl groups.

3. As a wrapper for a cigarette, a polymer of a non-cellulosic material comprising hydrogen and carbon atoms and free of carbonyl groups.

4. A wrapper for a cigarette comprising polyethylene and being free of carbonyl groups.

5. A smoking article comprising tobacco and a wrapper therefor, said wrapper being a non-cellulosic material comprising hydrogen and carbon atoms and free of carbonyl groups.

6. A smoking article comprising tobacco and a wrapper therefor, said wrapper being a polymer of non-cellulosic material free of carbonyl groups.

7. A smoking article comprising tobacco and a wrapper therefor, said wrapper being a polymer of a non-cellulosic material comprising hydrogen and carbon atoms and free of carbonyl groups.

8. A smoking article comprising tobacco and a wrapper therefor, said wrapper comprising polyethylene and being free of carbonyl groups.

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