BIODEGRADABLE COMPOSITES

The present invention concerns biodegradable composite fibres.

One of the most pressing issues for manufacturers of fibres is the rate at which the fibres biodegrade. Cellulose acetate fibres can take between one month and three years to biodegrade, dependant on environmental conditions.

A range of approaches to the preparation of biodegradable fibres, particularly for use in the manufacture of cigarette filter tows, have been suggested and include the use of composites of cellulose acetate with other biodegradable polymers, additives for increasing the rate of degradation of cellulose acetate, cellulose acetate with a low degree of substitution (DS) for increased biodegradability, and biodegradable polymers such as PHB/PVB and starches as the filter tow or fibre raw material.

However, to date no satisfactory commercial solution has been found for producing consumer-acceptable fibres that degrade sufficiently quickly

The present invention seeks to address these problems.

According to the present ~~invention~~ disclosure there is provided a biodegradable fibre comprising composite filaments of cellulose and cellulose acetate.

In accordance with one aspect, there is provided a biodegradable fibre comprising composite filaments of cellulose and cellulose acetate, wherein the composite filaments are spun from a dope comprising cellulose and cellulose acetate.

In accordance with another aspect, there is provided a material woven from or otherwise produced from the biodegradable fibre as disclosed herein.

In accordance with another aspect, there is provided a garment or soft furnishing at least partly made from the material as disclosed herein.

In accordance with another aspect, there is provided a process for manufacturing a biodegradable fibre as disclosed herein, comprising providing a solution dope comprising a blend of cellulose and cellulose acetate in an ionic liquid or in N-methylmorphilone-N-oxide (NMMO), and spinning or casting the blend into a protic solvent to generate fibres.

Cellulose and cellulose acetate are typically cast in the form of fibres or films. In one of its ~~aspects~~embodiments, this ~~invention~~ disclosure concerns fibres. Preferred fibres in accordance with the ~~invention~~ disclosure comprise fibres spun from a coagulated solution of cellulose and cellulose acetate.

Reference herein to composite filaments of cellulose/cellulose acetate shall be understood to mean filaments spun from a dope comprising cellulose and cellulose acetate.

We have found that composite filaments of cellulose/cellulose acetate have significantly greater biodegradability than equivalent filaments comprising only cellulose or cellulose acetate. Without wishing to be bound by any such theory, we believe that the presence of acetate in the composite may disrupt the crystallinity of the cellulose, causing it to biodegrade more rapidly than cellulose itself.

Conventionally, cellulose is cast or spun from viscose, and it is difficult or impossible to cast or spin cellulose acetate from the same blend because of the likelihood of hydrolysis of the cellulose acetate under such conditions. Conversely, cellulose acetate is conventionally cast or spun from acetone and it is difficult or impossible to cast or spin cellulose from the same blend because of the limited solubility of cellulose in acetone.

However, we have found that by casting or spinning cellulose and cellulose acetate from an ionic liquid (IL) or from *N*-methylmorphilone-*N*-oxide (NMMO),