

## CELLULOSIC FIBRES FROM SOLUTION

G. F. ANGELINI

*Centro Sprerimentale 'Marinotti', SNIA-Fibre, Cesano Maderno (Mi), Italy*

Cellulosic fibres formed from solutions were the first man-made fibres and have been in existence for almost a century. Currently they amount to 23% of the world production of man-made fibres. Their special advantages are:

- (i) use of a natural, renewable raw-material;
- (ii) low total energy content;
- (iii) good processing characteristics combined with a high degree of customer comfort.

The present processes used to manufacture cellulosic man-made fibres are the Cuprammonium and Viscose processes. The latter is the most widely used. In the last ten-year period, these processes have experienced remarkable technological advances that have enabled fibres with improved physical properties to be obtained, in order to solve environmental and ergonomic problems, as well as to reduce the manufacturing and end-use costs. These results have been obtained through a remarkable improvement of the plant efficiency, achieved by a thorough knowledge of the physical chemistry of the process and through strict control of process parameters using new automation technology. These developments have rapidly made many existing plants obsolete. As a consequence cellulosic man-made fibre production is moving to developing countries and to those countries where there is a large domestic market. In these countries the installation of a completely new plant is economically viable.

Extensive research on completely new processes for the manufacture of cellulosic man-made fibres was undertaken in the early 1970s. New solvents and/or new soluble cellulosic derivatives have been studied and tested. However, for the present at least, these have not resulted in new industrial processes.

In the solvent area, research has been devoted to non-aqueous organic solvents. For these systems the most serious problem is achieving total and inexpensive recovery.

In addition, for some solvents it is difficult to control the degradation of dissolved chains. The soluble derivatives investigated (cellulosic ethers and esters) have so far not quite met the main requirements for fibre formation – a fast and total regeneration of the cellulosic fibrous matrix from solution without undesirable effects on the properties of the resulting fibres.

It must be recalled that among the advantages of the modern Viscose process there is the possibility of obtaining fibres of widely different characters to satisfy the ever increasing and specialised demand of the fibre market.