From commercial textile fibres to activated carbon fibres: Chemical transformations

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Abstract

The production of activated carbon fibres from commercial acrylic textile fibres was analysed in order to study the chemical transformations
suffered by the precursor during the process. The thermal degradation of the precursor polymeric chain starts with the cyclisation of the structure
with acetate ion from vinyl acetate acting as a catalyst. The chemical transformations continue with both cyclisation and dehydrogenation
reactions which result in the formation of several functional groups. The groups identified for the carbonised fibre by FTIR were amines,
amides, imides, lactones and –OH, whereas for the activated carbon fibre the groups that can be identified were pyrones, lactones, amines,
amides and OH.

Keywords: Microporous materials; Heat treatment; FTIR; Surface properties