**Attempts to produce carbon fibre precursors from Victorian lignite**

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**Abstract**

Carbon fibre (CF) is a high value-added carbon material which is one of the strongest and lightest materials available today. It is being increasingly substituted for traditional materials such as steel and aluminium in aerospace, civil engineering, the military, automotive and sports equipment industries because of its high rigidity, high tensile strength and chemical resistance combined with low weight [1, 2]. CF are currently obtained mainly from polyacrylonitrile (PAN) and also to some extent from a variety of different raw materials such as rayon, pitches, resins and discrete chemical compounds such as methane and benzene [1]. However, production and utilization are limited because of high prices that are due to expensive starting materials and production cost [3]. Therefore, there is a continuing search for cheaper starting materials. Much work has been done on using lignin from plants as source of CF [4, 5]. One potential candidate is coal, including lignite. Victorian lignite (VL) is very accessible, has very low concentrations of mineral impurities and is also a very cheap precursor material by virtue of its accumulation in large deposits that are mined by open cut methods [6]. Its significant resemblance to lignin makes it highly prospective as a CF precursor. Solvent extracts of VL at high temperature have already been trialled as sources of CF [3, 7].

The ambitious aim of this project is to produce feedstocks for CF from VL. This study is investigating a range of techniques to modify the VL chemically to produce CF precursors. Several methods have been trialled and precursor materials have been produced. These materials were mixed with a conventional precursor at various concentrations and the mixtures were subjected to electrospinning and wet-spinning to make the raw fibres. The raw fibres were characterised and compared by a range of techniques.

**References**:

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