UNIVERSITY OF WYOMING
Wyoming Technology Transfer and Research Products Center

Materials Derived from Coal Using Environmentally Friendly Solvents

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Patent Status:
Patent Pending

Description of Technology

Ionic liquids (ILs) are salts that are in their liquid form below 100°C. They are generally considered "green" because they can work under less severe conditions. This is due to them having low melting points, non-flammability, and negligible volatility. IL solvent extraction is being used for the dissolution of cellulosic biomass, but is still in its infancy for coal depolymerization.

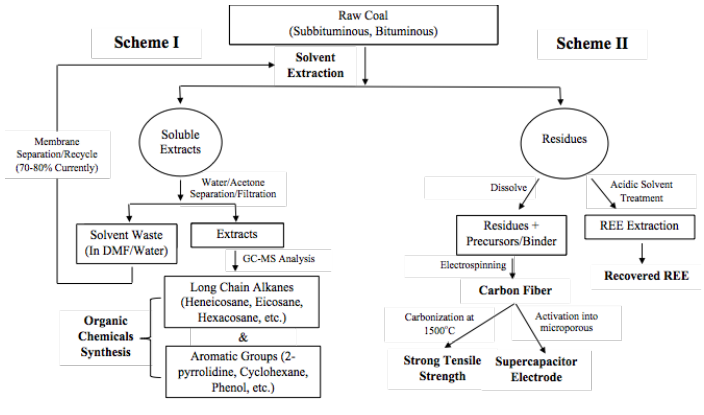
Researchers at the University of Wyoming are using IL solvent extraction on coal to produce carbon fiber from the insoluble coal tar. From their experiments they have shown that they can use different cation and anion combinations to selectively cleave organic compounds from coal using a diluted IL solution. They can then use the diluted IL solution to wash post- and pre- combustion coal in order to pre-concentrate rare earth elements. The residual coal compounds that are left because they are insoluble in the diluted ILs can then be used to make carbon fiber with desirable mechanical and thermal properties. The IL solution is also recyclable which reduces the cost of the process and also allows it to achieve zero-waste for the whole process.

Applications

This process adds new value to materials. It also uses environmentally friendly solvents to do this. It is able to pre-concentrate rare earth elements as well as create carbon fiber in a new way. This process is also a closed system with recyclable solvents and zero waste.

Features & Benefits

- Environmentally friendly
- It is a closed system so therefore cheaper costs
- Zero-waste for the whole process
- Ability to selectively cleave organic compounds from coal
- Pre-concentrate rare earth elements in coal
- Makes carbon fiber with desirable mechanical and thermal properties



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