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.

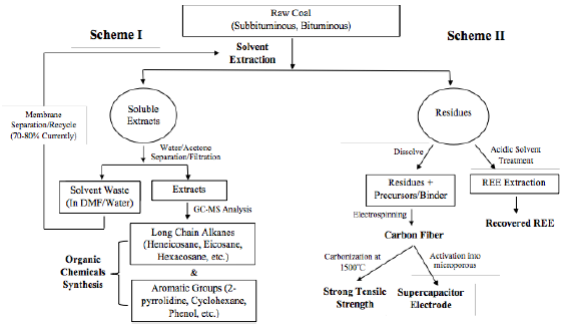
Researchers at the University of Wyoming are using IL solvent extraction on coal to produce carbon fiber from the insoluble coal tar. From their experiments they have shown that they can use different cation and anion combinations to selectively cleave organic compounds from coal using a diluted IL solution. 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 sol

Applications

Although the coal industry plays a major role in energy production, as the world tries to turn toward more environmentally friendly methods of energy production coal is in need of new uses to keep the industry alive for years to come. This technology creates two new uses for coal which can be done simultaneously to the same batch of coal. First, this technology is able to pull rare earth elements out of coal by using environmentally friendly solvents. These are used in many electronics and materials. Along with that, the left-over coal sludge can be used to create carbon fiber. Most importantly, these processes are a closed system and can be done with zero waste. The associate dean for research for engineering at the University of Utah believes that the future of the coal industry is bright because of these types of technologies, and although it may not replace the energy use for coal, it will bring a fresh industry to coal.

Features & Benefits

- Environmentally friendly
- It is a closed system which reduces 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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