

WVU Researchers Develop Process To Convert Coal into Commercial Product

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CHARLESTON – When most people think of oil, they think of gasoline, but most oil consumed in the United States doesn't end up in gas tanks.

Instead, it is used to make a wide variety of products, from plastic chairs to polyester suits. Now a handful of **West Virginia University** chemical engineers say they have developed a process to extract the raw materials to make those products from coal instead of oil — a move that could help reduce the nation's dependence on foreign oil.

“Even if all the gasoline (used in the U.S.) were replaced, that would not be enough to get us off of imported petroleum because there are so many other products made from petroleum,” said **Al Stiller**, WVU professor of chemical engineering.

Stiller and other WVU researchers talked about their new coal conversion process during the Industries of the Future-West Virginia Day at the Capitol Jan. 15, an event co-sponsored by WVU and the **West Virginia Division of Energy**.

To showcase their work, researchers brought along a one-ton graphite electrode used to generate the heat needed to smelt metals. It was made from materials extracted from coal. However, the electrode had to wait outside in the back of a **U-Haul** truck because it would have been too unwieldy to get up the Capitol steps and into the building itself.

The process the researchers developed is a variation on the better-known process to convert coal into diesel fuel. Their goal instead was to turn West Virginia

coal into a liquid similar to heavy-crude petroleum, which is used to produce products such as pitches and cokes.

They developed a synthetic pitch that could be a substitute for petroleum-based binder pitch, which is a key ingredient in carbon and graphite components used mainly by the metals smelting industry. Nearly 1 million barrels of binder pitch are used in the U.S. annually, according to WVU.

The synthetic pitch was blended with conventional pitch to make 21, one-ton graphite electrodes, which were tested at a commercial electric-arc steelmaking furnace. The electrodes performed as well as conventional electrodes with no significant difference in results, WVU researchers said.

The WVU researchers teamed up with two West Virginia companies, **GrafTech International Ltd.** and **Koppers Inc.**, on the production and testing of the electrodes.

The synthetic pitch is only the first of what researchers hope will be many products that could be made from coal using the new extraction process. The total North American market for high-quality pitches and cokes is about 5 million tons, which represents the equivalent of about 30 million barrels of crude hydrocarbons.

Environmentalists and others have criticized the process to produce fuels and other liquids from coal because it can produce carbon dioxide, which is a greenhouse gas. However, Stiller said the process developed by WVU should put out no more CO₂ than the process used to derive chemicals from petroleum.