**Title:** Syngas Production from Petroleum Coke Gasification

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Petroleum coke is a major byproduct that historically has been used as a substitute for coal in power production or as a fuel in cement manufacture. The decreasing quality of crude oil refined in the United States means that more petroleum coke is being produced, often with much higher metals and sulfur content.

Our objective is to evaluate a better route for using low quality petroleum coke by converting it into a feed for our linked acetic acid production team while capturing all of the sulfur, metals and most of the CO2 from combustion. Since petroleum coke is linked to the refining of crude oil, it is available at much lower cost and in much larger quantities than bio-feeds. In addition, because petroleum coke is a byproduct, and not directly extracted from the environment, it lacks the negative land use impacts of bio-feeds.

In our process, petroleum coke along with oxygen and steam are fed into an entrained flow gasifier to produce synthesis gas, a combination of carbon monoxide, hydrogen, carbon dioxide and hydrogen sulfide. Sulfur is a poison to downstream chemical production catalysts and must be removed from syngas to ppm levels by the Claus process. A significant advantage of our process is that unlike burning petroleum coke for conventional power, the CO2 from combustion can be captured and sent via pipeline for sequestration, or enhanced oil recovery.

Aspen, a thermodynamic simulation tool, is used to establish the material and energy balance for the overall process.