

Thermal Deoxygenation Reactor



This reactor was designed at FBRI by Sedat Beis, Clay Wheeler and Keith Hodgins. Keith Hodgins constructed the reactor. It is a general-purpose, 40-liter, high-temperature, atmospheric, stirred reactor with a vapor condensing system. The reactor was designed and built for converting organic acids from the BioFine process to high-grade oil by the TDO process.

The TDO process was developed by Clay Wheeler and his students with the assistance of Sedat Beis. Primary student contributors were undergraduates Thomas Schwartz, Paige Case and Jon Hessler.



The TDO process converts organic acids from the BioFine process to high-quality crude oil by reacting the acids with lime, drying the resulting salts, heating the salts to about 900°F, and then condensing the vapors. The condensed vapors consist of water and oil. The oil is a mixture of gasoline, jet fuel and diesel. Currently, this reaction is done in a batch method, with plans to convert it to a continuous process.

Funds for construction of the TDO reactor were provided by a Defense Logistics Agency grant. FBRI is currently working with SeaChange Group LLC and in discussions with other potential collaborators.