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Pyrolysis of atmospheric residue of petroleum (RAT) using AlSBA-15 nanoporous materials

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The environmental impacts caused by the oil industry are themes in constant discussion around the world. Considering the advances in the scientific and technological research, with the goal of minimizing this environmental pollution, the application of nanoporous catalytic materials are an alternative treat these wastes, aiming obtaining valuable products, such as middle distillates in the range of gasoline and diesel fuels. In this work, is discussed the application of mesoporous AlSBA-15 as promising material for the pyrolysis process of atmospheric residue in order to obtain high-value hydrocarbons. The acidity associated with the mesoporous are responsible by the catalytic activity and selectivity. The pyrolysis of atmospheric residue oil (RAT) was investigated using nanostructured aluminosilicate catalyst type AlSBA-15 with silica / alumina ratios equal to 25 and 50 (SBA: Santa Barbara Amorphous). This is a very promising material in the refining and processing of petroleum residues, because their mesoporous facilitate access of bulky hydrocarbon molecules to active sites. Pyrolysis of the RAT was performed in a thermobalance, using nitrogen as a carrier gas, where the sample was heated to 800°C. Catalytic pyrolysis was carried out with the sample RAT containing about 20% by weight of AlSBA 15. Based on the TG data, the kinetic model utlizando Flynn-Wall, multiple heating reasons, it was determined that the activation energy of the RAT was superior to RAT/AlSBA-15, across the range of decomposition of the residue, indicating that the nanostructured material is a promising material for processing the RAT, in order to obtain liquid products, in the range of petrol and diesel. Through equipment pyrolysis coupled to a gas chromatograph and mass spectrometer were determined percentage of hydrocarbon fractions in the $C_6 - C_{12}$ (gasoline) $C_{13} - C_{18}$ (diesel) and C_{19} - C_{42} (diesel) tracks.

Biography

Antonio S. Araujo has completed his PhD at State University of Sao Paulo (1992) and postdoctoral studies from Kent State University (1999). He is titular professor at UFRN, Brazil. He has published more than 120 papers in reputed journals.

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