Characterizations and application of supported ionic liquid [bmim][CF3SO3]/SiO2 in CO2 capture

ABSTRACT

Supported ionic liquid (IL) [bmim][CF3SO3] on SiO2 was prepared, characterized and its potential evaluated for CO2 capture via adsorption and desorption studies using gas adsorption analyzer. The physical and chemical properties were determined using N2 adsorption/desorption and CO2-TPD analysis. The increasing IL loading caused a drastic decrease in the surface area as well as pore volume due to the confinement of IL within the micropore and mesopore area. However, the increasing IL loading increased the basicity of the sorbent which significantly enhanced CO2 chemisorption. Supported [bmim][CF3SO3] on SiO2 revealed the physical and chemical adsorption of CO2 and resulted in a remarkable CO2 adsorption capacity at atmospheric pressure and room temperature (66.7 mg CO2/gadsorbent) which has great potential in industrial applications.

Keyword: Adsorption; Characterizations; CO2 capture; Desorption; Ionic liquid