

IONIC LIQUID BASED SORBENTS FOR ACIDIC GAS CAPTURE

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Acidic gases (sulfur dioxide and nitrogen dioxide) are detrimental to human health and hinder direct use of atmospheric air in technologies, such as, polymer electrolyte membrane (PEM) fuel cells. The gaseous air pollutants react with fuel cell components such as Pt catalyst, greatly reducing the efficiency of the PEM fuel cells. A majority of the state of the art acidic gas air pollutant mitigation technologies utilize non-regenerable sorbents. Hence, there is a need to develop alternate sorbent materials with potential for higher performance and regeneration, and ionic liquids offer that promise. Ionic liquids are a class of “green compounds” which have recently received considerable attention in numerous applications due to their negligible volatility, large liquidus range, and tunable chemical properties. The practical use of ionic liquids in gas separation is limited by their high viscosity and the small gas-liquid interface which reduces gas diffusion rates through the ionic liquids. Our efforts in mitigating the effects of high viscosity of the ionic liquids, by impregnating thin films of ionic liquids onto granulated activated carbon support will be presented as well as our theoretical and experimental work on simultaneous sorption of SO₂ and NO₂ by the activated carbon supported ionic liquid sorbent. Lastly recent developments in acid icgas capture using ionic liquid-based sorbents will be presented.