

Absorption of Nitric Oxide in Simulated Flue Gas by Azole-Based Hydrophobic Deep Eutectic Solvents

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Abstract

Functional hydrophobic deep eutectic solvents composed with azoles as hydrogen bond donors, and [N8881]Cl and [N8881]Br as hydrogen bond acceptors were designed and synthesized to absorb low concentrations NO. The good hydrophobicity reduces the cost of operating effectively. Moreover, the capacity of 10 vol % NO absorption by Im-[N8881]Cl DES can reach 3.91 mol NO / mol Im at 40 °C. Besides, Im-[N8881]Cl DES can be regenerated, and the absorption capacity of NO by the regenerated Im-[N8881]Cl DES shows no significant loss for at least 5 recycles. FTIR and ¹H NMR were used to verify the mechanism. The results indicate that there is chemical interaction between NO and Im-[N8881]Cl DES and the main chemical active sites are N (2) and N (5) on Im by forming NONOates. This series of hydrophobic, efficient and reversible NO absorbents may provide a new idea for NO capture technique.

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