

Adsorbents for the Separation and Storage of Gases

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Adsorptive separation of gases is being increasingly used commercially after the development of pressure or vacuum swing adsorption cycle. For example, around 20% of air separation is being presently done using adsorption processes making it competitive to cryogenic separation of air in certain situations. Hydrogen recovery in refinery and petrochemicals is nearly completely done by adsorption process. Extensive research efforts are being directed for the recovery of carbon dioxide from flue gases using varied adsorbent materials. There is lot of interest in developing high porosity materials for Natural gas and hydrogen storage especially for transportation sector. Present talk is focused on development of materials for adsorptive recovery of carbon dioxide from power plant flues gas; separation of oxygen from argon. Zeolite and hydrotalcite based materials have been studied for selective adsorption of carbon dioxide from nitrogen and will be presented. Recent study done by the author on the development of strontium exchanged zeolite X and its potential to for oxygen - argon separation at ambient temperature will be discussed. Recent study on transition metal exchanged zeolites and mesoporous solids based materials studied for storage of hydrogen will also presented.