

Novel Approaches to the Preparation and Exploitation of Carbon Capture Materials

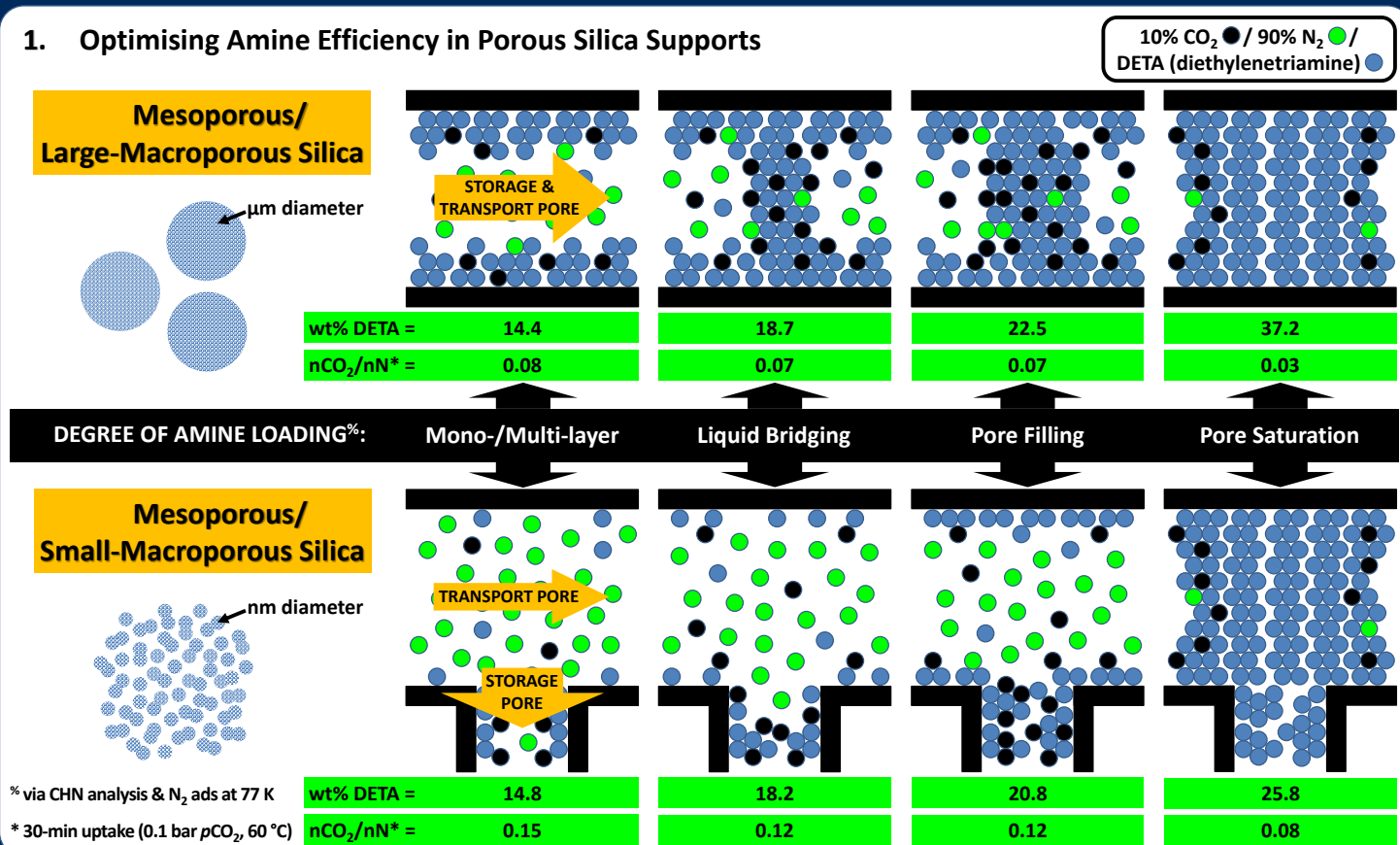
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1. Amine-Silica Composites for Carbon Capture: A Pore Structure Utilisation Study

The high loading of amine in porous silica supports can significantly reduce the mass transfer of gas from the bulk to the gas-liquid interface.[1,2] To demonstrate this we have loaded amine in micro- and nano-meter diameter mesoporous silica particles until the amine saturates the interparticle porosity, hence the reduction of gas transport pathways and gas-liquid interfacial area.[3]

1. Optimising Amine Efficiency in Porous Silica Supports

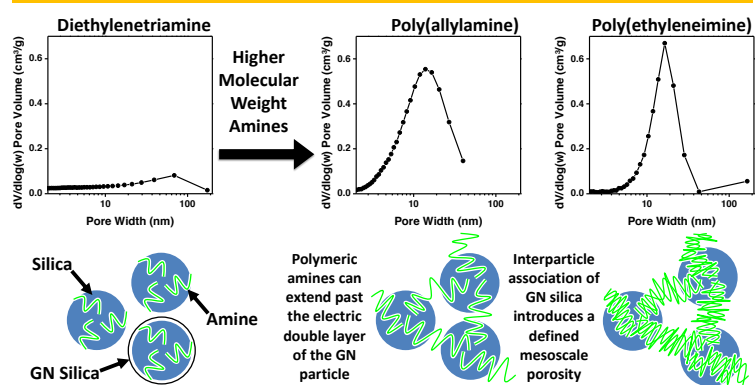


2. Green Nanostructured Silicas for Carbon Capture: A Bioinspired Approach to Solid Adsorbents

Simple amine-functionalised compounds, such as short- and long-chain polyamines,[4] can be used to catalyse the aggregation of silica at room temperature in aqueous solution of near-neutral pH. This methodology is inspired by the biosilicifying mechanisms occurring in diatoms, radiolaria, sponges and plants.[5] The novelty of our research lies in exploiting these green nanostructured (GN) silica for CCS.[3,6]

2a. Using Amine Additives to Tune Porosity

Amine Additives Play Multiple Roles: Catalyst, Scaffold and CO₂ Sorbent



2b. The CCS Potential of GN Silicas

