

Porous Materials with Active Sites Created via In-Pore Synthesis

Summary

Vanderbilt researchers have synthesized porous adsorbent materials for the capture of toxic industrial chemicals. These adsorbent materials have finely dispersed reactive sites that allow for higher adsorption capacities than existing materials. They can be used in filters for the military, homeland security, first responders, and for a wide range of industrial and commercial catalysts to capture toxic gases such as ammonia and sulfur dioxide.

Addressed Need

Existing porous materials are unable to fully adsorb all toxic industrial chemicals because they are impregnated with insoluble salts using incipient wetness and solution based approaches. This invention adds soluble salts at dispersed sites, which creates a precipitate of the insoluble salt within the porous material. Thus, it has a higher adsorption capacity than existing materials.

Unique Features

- ◇ In-pore synthesis of finely dispersed sites in adsorbents or catalysts
- ◇ Ability to adsorb ammonia and sulfur dioxide with enhanced capacities

Technology Development Status

This material has been synthesized and tested with zinc carbonate precipitated directly within pores in a two-step process. Additional tests are forthcoming in order to create precipitates of magnesium phosphate, magnesium carbonate, and zinc phosphate. The use of copper cations will also be explored.

Intellectual Property Status

A patent application has been filed on this technology.

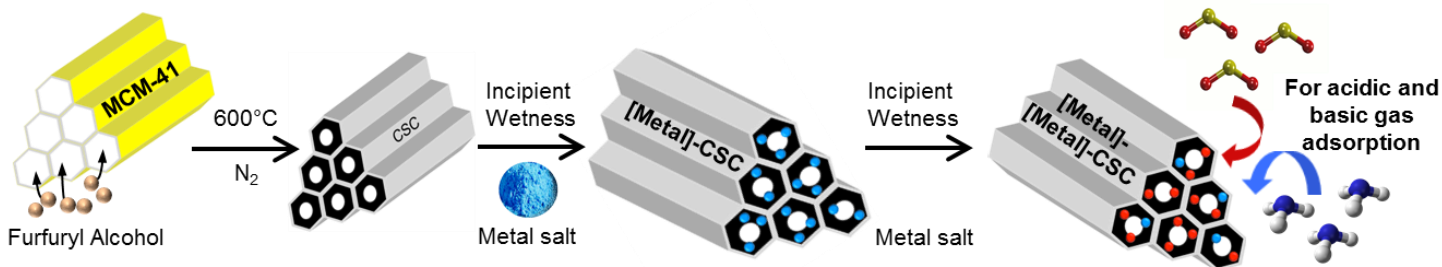


Figure 1: In-pore synthesis of insoluble precipitates on carbon silica composites (CSC) for ammonia and sulfur dioxide adsorption.

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