



Contribution ID: 120

Type: Oral

Smart adsorbents for gas separation research at Australian Synchrotron

Friday, 21 November 2014 11:45 (20 minutes)

Zeolite molecular sieves are one of the most important materials for separation of molecules. We discovered smart porous materials for gas separation –zeolites containing cations that function as molecular trapdoors allow guest-selective, size-inverse separations. For example, a “molecular trapdoor” mechanism in specifically tailored zeolites which produces a counter-intuitive size-inverse “sieving” for CO/N₂, and a record high selectivity for CO₂/CH₄ separation over a large pressure range. [1] In the other case, we found an unusual operating regime on a chabazite zeolite in which the adsorption selectivity for N₂ over CH₄ inverts from being more selective for N₂ at 253 K, to becoming less selective with increasing temperature and eventually becoming selective for CH₄ over N₂ above 293 K. [2] These materials could benefit for carbon capture and gas purification.

[1] Shang, Jin; Li, Gang; Singh, Ranjeet; Gu, Qinfen; et al. JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, 134, 46, 19246-19253, (2012)

[2] Shang, Jin; Li, Gang; Gu, Qinfen; et al. CHEMICAL COMMUNICATIONS, 50, 35, 4544-4546, (2014)

Keywords or phrases (comma separated)

powder diffraction, zeolite, gas separation, structure

Primary author: Dr GU, Qinfen (Australian Synchrotron)

Co-authors: Dr LI, Gang (The University of Western Australia); Dr SHANG, Jin (Melbourne University)

Presenter: Dr GU, Qinfen (Australian Synchrotron)

Session Classification: Energy Materials

Track Classification: Energy Materials