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# Filtration of Chlorine and Hydrogen Chloride Gas by Engineered UiO-66-NH<sub>2</sub> Metal-Organic Framework

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## Highlights

- The metal-organic framework UiO-66-NH<sub>2</sub> was pressed into 20 × 40 mesh granules
- Breakthrough testing was conducted against chlorine (Cl<sub>2</sub>) and hydrogen chloride (HCl) and compared to broad spectrum carbon (BSC)
- Both Cl<sub>2</sub> and HCl performance of granulated UiO-66-NH<sub>2</sub> met or exceeded that of BSC
- Data show the potential of metal-organic frameworks to be utilized in filtration devices

Keywords:

Chlorine, hydrogen chloride, metal-organic framework, UiO-66-NH<sub>2</sub>, breakthrough

## Abstract

Chlorine (Cl<sub>2</sub>) and hydrogen chloride (HCl) are heavily utilized industrial chemicals that present significant respiratory health risks. The metal-organic framework UiO-66-NH<sub>2</sub> has shown an unprecedented ability in powder form to remove chlorine gas. Here, we engineered UiO-66-NH<sub>2</sub> into 20 × 40 mesh granules and evaluated their ability to remove chlorine and hydrogen chloride gas challenges. The exposed materials were characterized with nitrogen isotherms, powder X-ray diffraction, and attenuated total reflectance – Fourier transform infrared spectroscopy. Breakthrough results revealed

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