

Studying Nobles Gases with Photoelectron Spectroscopy

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We present a study on the photoelectron spectroscopy (PES) of noble gases, both in the gas phase at elevated pressures and when confined within silicate nanocages supported on a metal substrate. By leveraging X-ray photoelectron spectroscopy (XPS) under near-ambient pressure conditions, we examine noble gases in their free state and in constrained environments. The encapsulation process within the nanocages is investigated using controlled caging (by an ionization-mediated mechanism) and (thermal) uncaging experiments, revealing insights into confinement effects. These studies offer new perspectives on gas confinement at the nanoscale and demonstrate the utility of PES for characterizing encapsulated species in functional materials.

Keywords: Noble gases, Confinement Effects, Nanomaterials, Photoelectron Spectroscopy, Argon, Krypton, Xenon.

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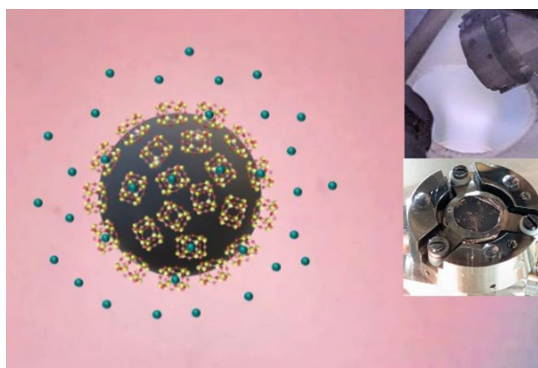


Figure 1. Illustration of a metal particle covered with hexagonal prism silicate nanocages in the presence of a Xenon plasma. The insets show photos of the sample in the center of a sample holder (bottom right) and the sample exposed to the xenon plasma (top right)