

## Functional Porous Materials for Practical Applications

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Our group specialises in the design of functional nanospaces in inorganic materials with controlled compositions and morphologies toward practical applications. We have focused on the design of novel nanocrystals and nanoporous materials toward various applications, including batteries, fuel cells, solar cells, chemical sensors, field emitters, and photonic devices. Specifically, nanoporous metals can be produced through surfactant-based synthesis assisted by electrochemical methods. Owing to their metallic frameworks, nanoporous metals possess high electroconductivity and high surface areas, holding promise for a wide range of electrochemical applications. Furthermore, we have developed several approaches towards controlling the orientation of tubular nanochannels. The controlling the geometry of nanochannels at a macroscopic-scale is important for innovative applications such as chemical devices and electrodes with enhanced diffusions of guest species.