

## Synthesis of Ordered Mesoporous Molybdenum Dioxide using Nano-Replication Method

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Transition metal oxides offer a variety of interesting properties such as catalytic, optic, electrochemical, magnetic and so on. Among the transition metal oxides, the molybdenum dioxide ( $\text{MoO}_2$ ) have been used as catalyst in industry such as partial methanol oxidation with Fe or Ag for preparation formaldehyde, anode material of lithium-ion battery, isomerization of alkene materials, electrochromic materials.

Generally, the  $\text{MoO}_2$  prepared by thermal evaporation and reduction of  $\text{MoO}_3$  nano-particle which prepared by de-ionized water and a few drops of a binder. The synthesized  $\text{MoO}_2$  nanoparticle was low catalytic activation due to the extremely low surface area ( $< 5\text{m}^2/\text{g}$ ). Here, we reported the synthesis method of ordered mesoporous  $\text{MoO}_2$  for improving the low surface area of the  $\text{MoO}_2$ . This as the nano-replication method used mesoporous silica as template with ordered porosity (2~3nm) and high surface area ( $> 800\text{m}^2/\text{g}$ ). The synthesized mesoporous  $\text{MoO}_2$  proved to have high surface area ( $> 100\text{m}^2/\text{g}$ ) and ordered porosity by the characterizations of powder X-ray diffraction (PXRD), scanning electron microscopy (SEM), transmission electron microscope (TEM) and  $\text{N}_2$  adsorption.