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A b s t r a c t

Title	Synthesis and Raman Spectroscopy characterization of Molybdenum-containing catalysts
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(800 words)

The preparations of alpha and beta silicomolybdic acid (SMA) are investigated by both impregnation and sol-gel methods. From impregnation way, an interlayer containing undefined molybdenum (VI) oxide was found to have an important role on the thermal stability enhancement of metastable MoO_3 and beta silicomolybdic acid. On the preparation of alpha molybdic acid, $[\text{Mo}_{36}\text{O}_{112}(\text{H}_2\text{O})_{16}]^{8-}$ was determined as the main composition of blue molybdic acid solution obtained via cation exchanging of Na_2MoO_4 solution instead of molybdic acid (H_2MoO_4) as indicated in many published papers. On the other hand, hydrothermal sol-gel method was also applied to prepare both types of SMA and their catalytic properties were studied for the first time by methanol oxidation reaction.

There had been only 4 types of molybdenum (VI) oxide being known and a new type was successfully synthesized with very simple process and has high thermal stability. Though the single crystal hasn't been obtained yet but from powder XRD, TG-DTA and Raman data, the synthesized oxide is believed that it hasn't been observed before that.

Surface monomolybdate hasn't been observed on silica surface till now without the addition of alkaline ion despite of many attempts were reported. In this dissertation (chapter 5), it was successfully prepared in Mo-SBA-15 when MoO_2Cl_2 was used as molybdenum source.

Throughout this dissertation, Laser Raman Spectroscopy has been proving its unique ability in catalyst characterization by giving precise information of both supports and metal oxide in not only solid state but also solution. Precise info has been revealed to show the anchor of molybdenum species into SBA-15 and also the decomposition of MoO_2Cl_2 in the mixture of ethanol and tetraethyl orthosilicate mixture.

Finally, H_2MoO_4 has been used as molybdenum source in all experiments in this dissertation and proved its unique properties in catalysts preparation which haven't been reported yet.