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# Keggin Polyoxometalates Based Hybrid Compounds Containing Helix/Nanocages for Colorimetric Biosensing

Xiao Li, Kunfeng Zhou, Zhibo Tong, Jianbo Yang, Ning Sheng<sup>\*</sup>, Jisen Li, Jingquan Sha<sup>\*</sup>

*Key Laboratory of Inorganic Chemistry, Department of Chemistry and Chemical Engineering, Jining University, Qufu, Shandong, 273155, China*

E-mail: shajq2002@126.com

Tel: +8618865475613

## Abstract:

Two Keggin polyoxometalate (POMs) based hybrid compounds containing helix/nanocages as peroxidase-like mimics have been synthesized and structurally characterized. Single crystal X-ray diffraction analysis reveals that compound **1** exhibits a POM-pillared framework with open nanotube channels (*ca.*  $5.6 \times 5.8 \text{ \AA}^2$ ), in which  $\text{SiW}_{12}$  polyanions are sandwiched between the adjacent Cu-fkz sheets with meso-helix. And an unprecedented twisted octahedral hexamer nanocage (*ca.*  $10 \times 10 \text{ \AA}^2$ ) is observed in compound **2**. Compared with the other POMs involved peroxidase-like mimics, both compounds **1** and **2** exhibit higher peroxidase-like catalytic activities, broader applications range, faster respond time and lower detection limit, which maybe attribute to the maximized synergistic effects of  $\text{SiW}_{12}$  clusters, fkz molecules, metal ions and the distinct structure. Based on the facts, compounds **1** and **2** as enzyme mimics might expand their application around physiological pH conditions, and can be used as one kind of effective probe to detect  $\text{H}_2\text{O}_2$  in live organism.

## Graphical abstract

Two new Keggin polyoxometalates (POMs) based hybrid compounds containing helix/nanocages as peroxidase-like mimics have been synthesized and structurally

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