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Luyue Wang, Xinxin Xu, Zhongmin Feng, Lijun Bian, Yun Wang



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**WO<sub>3-x</sub> based composite material with chitosan derived nitrogen doped mesoporous carbon as matrix for oxygen vacancy induced organic pollutants catalytic reduction and IR driven H<sub>2</sub> production**

Luyue Wang, Xinxin Xu\*, Zhongmin Feng, Lijun Bian\*, Yun Wang\*

*Department of Chemistry, College of Science, Northeastern University, Shenyang, Liaoning, 110819, People's Republic of China*

xuxx@mail.neu.edu.cn (Prof. X. X. Xu)

bianlijun@mail.neu.edu.cn (Dr. L. J. Bian)

wyun1989@126.com (Dr. Y. Wang)

\*Author to whom correspondence should be addressed. Tel: +86-024-83684533, Fax: +86-024-83684533.

**Abstract**

A nitrogen doped mesoporous carbon matrix supported tungsten oxide composite material, **WO<sub>3-x</sub>@NC**, ( $1 > x > 0$ ), was fabricated successfully with chitosan and polyoxometalates as precursors through calcination. In this composite material, tungsten oxide particles with the size about 5 to 8 nm disperse evenly in the

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