



Au/ α -MoC catalyst for water gas shift reaction



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内容简介：

The water gas shift (WGS) reaction ($\text{CO} + \text{H}_2\text{O} = \text{H}_2 + \text{CO}_2$) is an essential process for hydrogen generation/upgrading in various energy-related chemical operations. Normally for a chemical reaction, higher reaction temperature renders higher reaction rate. However, from a thermodynamic point of view, WGS is an equilibrium-limited reaction that is favored at low temperature. In particular, the potential application in fuel cells requires the commercial WGS catalyst to be highly active, stable and energy-efficient. Under these criteria, decreasing the reaction temperature will not only give a considerable rise in the CO equilibrium conversion but will also exhibit potential in reducing the energy consumption, and match the working temperature of on-site hydrogen generation and consumption units. Here by creating Au layered clusters on an α -MoC substrate, we have successfully constructed an interfacial catalyst system for the ultra-low temperature WGS reaction. Water is activated over α -MoC at 303 K, while CO adsorbed on adjacent Au sites is apt to react with surface hydroxyls formed from water splitting, leading to an unprecedented low-temperature WGS activity.

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马丁，北京大学化学与分子工程学院/北京大学工学院教授。针对我国社会能源和资源优化利用过程，主要开展氢能制备与输运，以及高值碳基化学品/油品合成等方面研究工作。获得2013年度北京大学青年教师教学比赛一等奖，2014年度王选青年学者奖，2017年中国催化青年奖，2017年度中国科学十大进展。国家自然科学基金委员优秀青年基金、杰出青年基金获得者。2016年入选英国皇家化学会会士(Fellow of Royal Society of Chemistry)。2014-2017年担任英国皇家化学会Catalysis Science & Technology副主编；目前担任Chinese Journal of Chemistry、Science Bulletin副主编，Journal of Energy Chemistry、Joule、ACS Catalysis、Catalysis Science & Technology等刊编委和顾问编委。