

# Array modified PdAg/Al<sub>2</sub>O<sub>3</sub> catalyst for selective acetylene hydrogenation: Kinetics and thermal effect optimization

Chenglin Miao<sup>1</sup>, Luoyu Cai<sup>1</sup>, Yanfei Wang<sup>2</sup>, Xingjun Xu<sup>1</sup>, Jiarui Yang<sup>1</sup>, Yufei He<sup>3</sup>, Dianqing Li<sup>4</sup>, and Junting Feng<sup>3</sup>

<sup>1</sup>Beijing University of Chemical Technology

<sup>2</sup>Petrochina Petrochemical Research Institute

<sup>3</sup>State Key Laboratory of Chemical Resource Engineering

<sup>4</sup>Affiliation not available

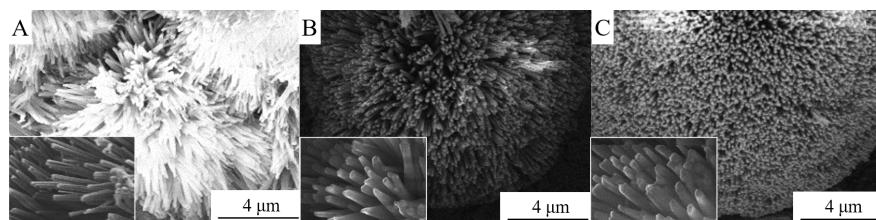
January 6, 2021

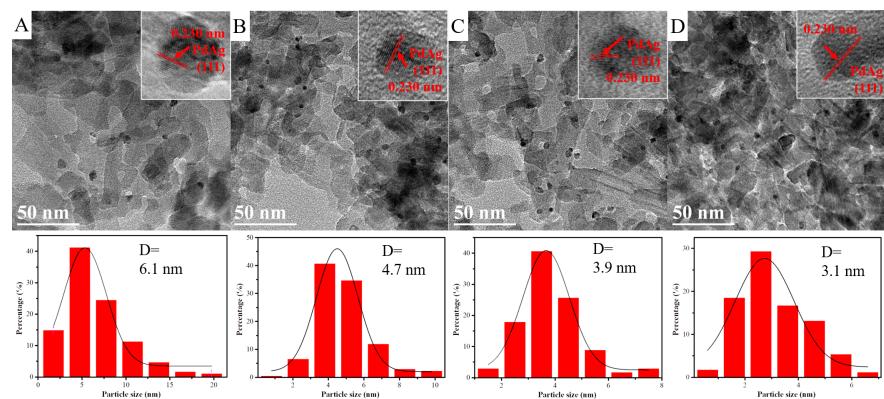
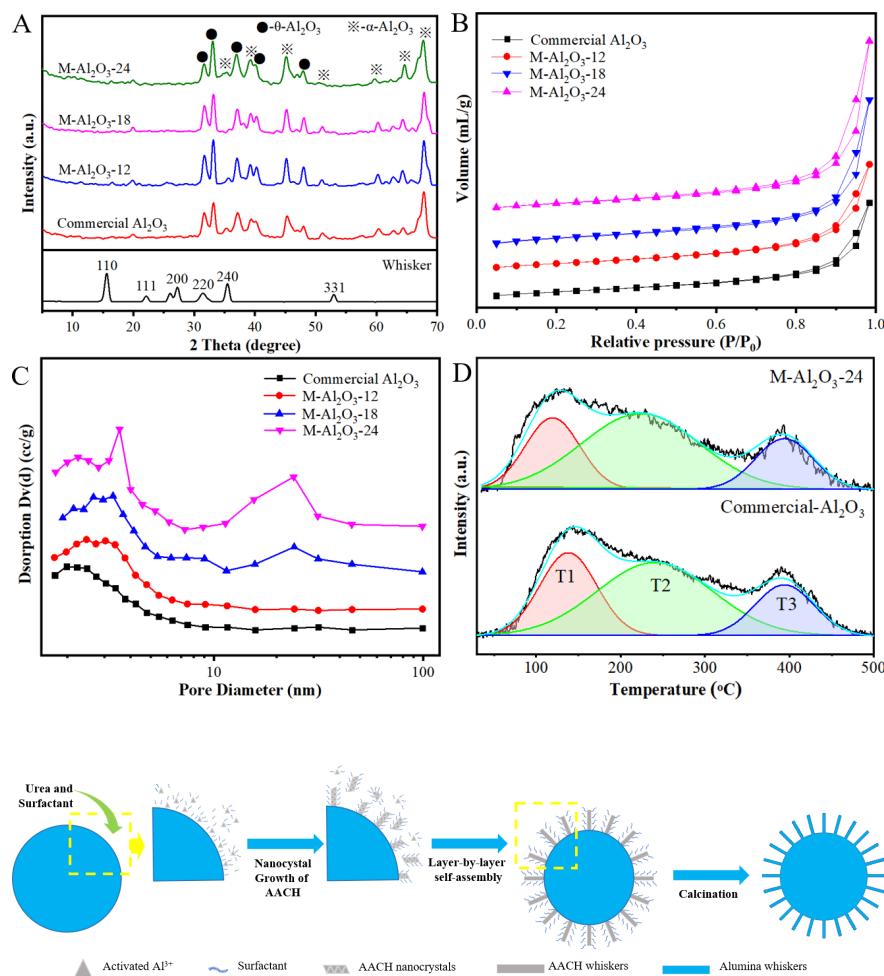
## Abstract

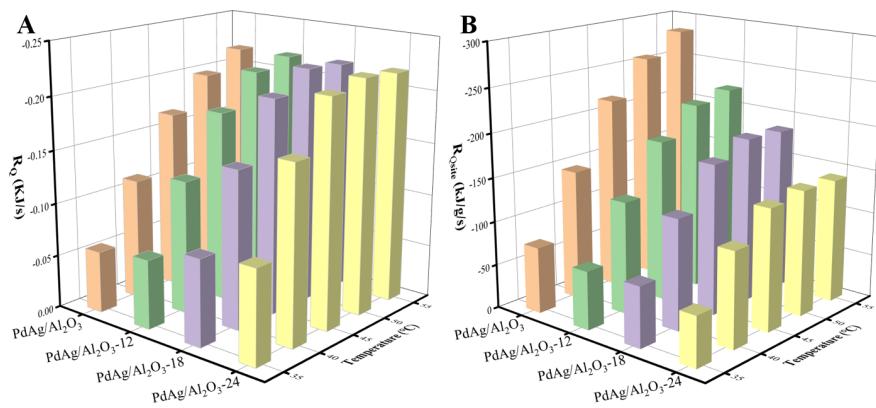
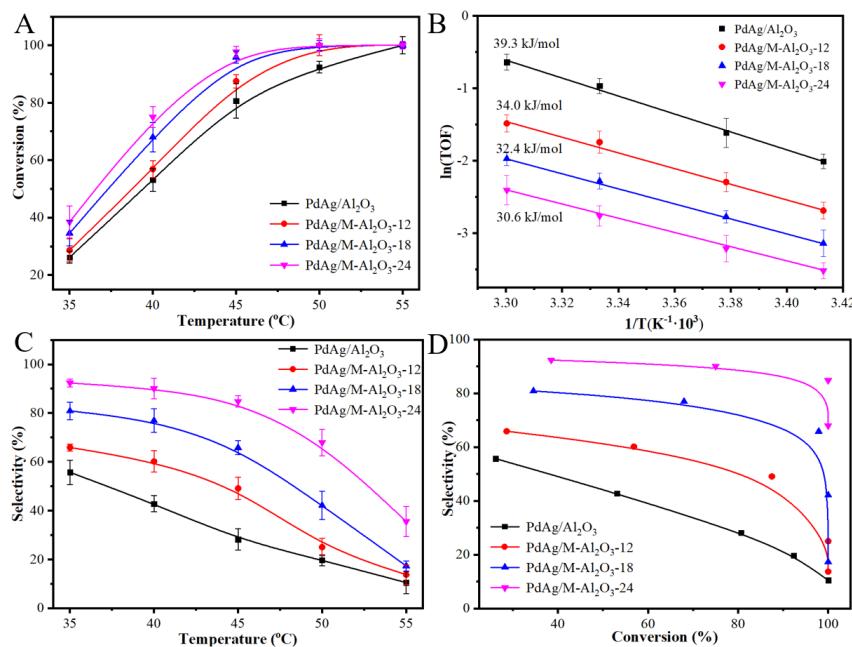
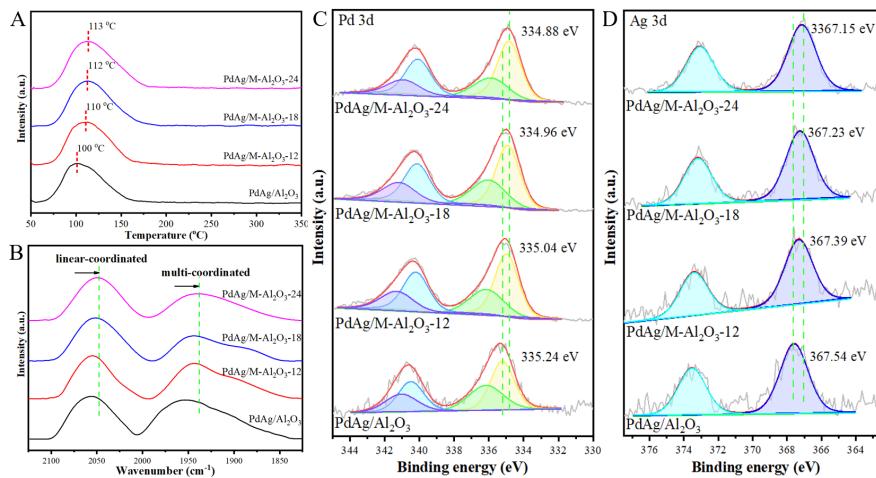
Aiming at the low surface area of high-temperature-calculated alumina limits the dispersion of active metals, an in-situ growth method is applied to fabricate the alumina array modified spherical alumina. Taking the modified alumina as support, the highly dispersed PdAg catalyst for selective acetylene hydrogenation is synthesized, which exhibits a remarkable enhanced intrinsic activity. Moreover, when the acetylene conversion reached 90%, the ethylene selectivity remains 89%. Preferred selectivity is assigned to more isolated Pd sites and high electronic density, which facilitates the desorption of the resulting ethylene. More importantly, the modified catalyst exhibits good structural stability and resistance to carbon deposition. From one aspect, the decrease of heat production rate over active site is conducive to reduce the reaction heat accumulation, thereby avoiding the formation of hot-spots over the catalyst. From another point of view, the outer opening pore structure of the modified alumina are benefit for the heat transfer.

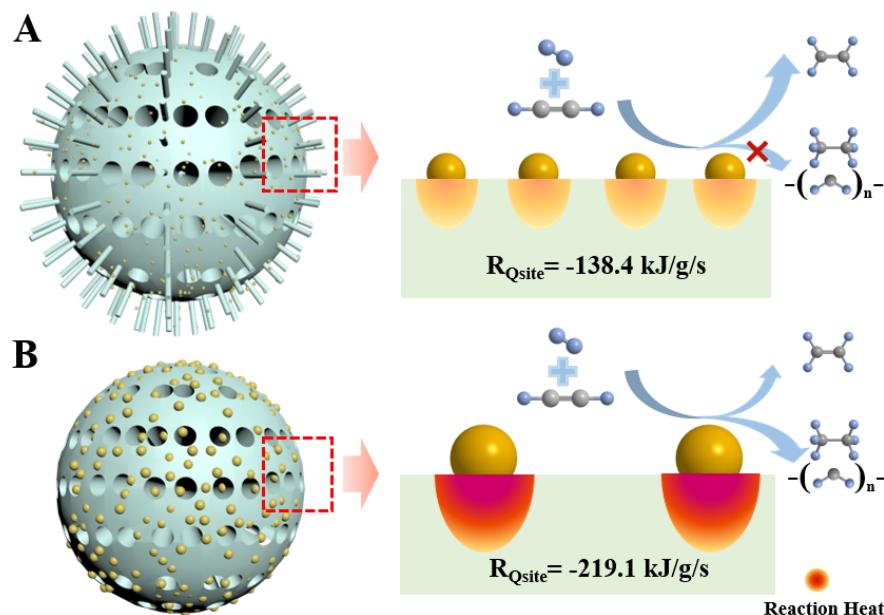
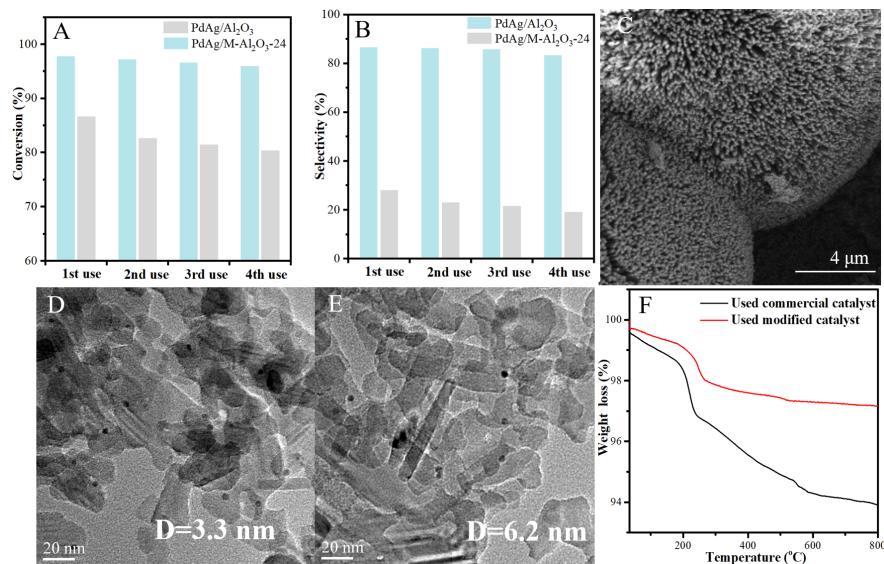
## Hosted file

mauscript-1211-2.pdf available at <https://authorea.com/users/387650/articles/502629-array-modified-pdag-al2o3-catalyst-for-selective-acetylene-hydrogenation-kinetics-and-thermal-effect-optimization>









## Hosted file

Tables.pdf available at <https://authorea.com/users/387650/articles/502629-array-modified-pdag-al2o3-catalyst-for-selective-acetylene-hydrogenation-kinetics-and-thermal-effect-optimization>