

Study of Pt Nanoparticle Catalysts a Step Toward Reduced Vehicle Nitrogen Oxide Emissions

Scientific Achievement

Observed chemical and structural changes to platinum (Pt) nanoparticle catalysts during the oxidation of nitrogen oxide (NO to NO₂), which is one step in the process to reduce nitrogen oxide emissions from cars

Significance and Impact

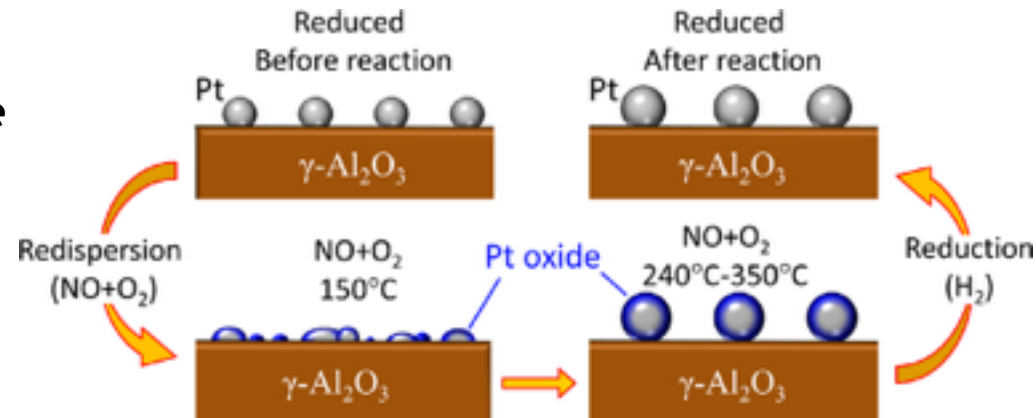
Study furthers effort to find more efficient catalysts for modern lean-burn engines, which do not adequately reduce NO_x emissions

Research Details

- Using x-rays, researchers "watched" the evolution of Pt nanoparticles during the conversion from NO to NO₂ – one step in the full NO_x storage and reduction reaction
- Results distinguish between several different PtO_x species present during the reaction, including PtO formed on the nanoparticles' surfaces; this is information that previous similar studies could not provide
- Researchers observed that more spherical particles catalyze the reaction more effectively
- This work will aid future studies to find optimal Pt catalysts for lean-burn engines

E Lira, LR Merte, F Behafarid, LK Ono, L Zhang, B Roldan Cuenya *ACS Catalysis* 4 1875-1884 (2014)

Work was performed at Brookhaven National Laboratory



Steps in the NO to NO₂ oxidation reaction, catalyzed by Pt nanoparticles. Particles tended to flatten, or redisperse, with PtO forming on their surfaces.