Catalytic properties at the nanoscale probed by surface x-ray diffraction and coherent diffraction imaging

David SIMONNE

(Ligne SIXS, Synchrotron SOLEIL, Gif-sur-Yvette)

THÈSE

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The focus of this study is the investigation of heterogeneous catalysts in situ and operando during ammonia oxidation, approaching industrial temperature and pressure.
Understanding this catalytic process and its associated structural changes is currently limited.
Different platinum samples, including nanoparticles and single crystals, are employed to bridge the gap between model studies and industrial catalysts.
The catalytic activity of these samples is measured to correlate structure and selectivity, aiming for nitrogen or nitric oxide production.
The ongoing challenge is developing heterogeneous catalysis with 100% selectivity and comprehending catalyst durability, aging, and deactivation.
Nanoparticle structure analysis at the nanoscale reveals volume, surface, and interface effects, along with various defects.
Bragg coherent X-ray diffraction imaging and grazing incidence X-ray diffraction are employed to study nanoparticles. Surface X-ray diffraction and X-ray photoelectron spectroscopy allows to probe individual crystal surfaces, linking them to catalytic activity for a better understanding of the reaction mechanism.

Les membres du jury sont :

Andreas STIERLE	Pr., University of Hamburg / DESY	Rapporteur et Examinateur
Thomas CORNELIUS	DR., IM2NP, Aix-Marseille Université	Rapporteur et Examinateur
Sylvain RAVY	DR., LPS, Université Paris-Saclay	Examinateur
Gerardina CARBONE	Dr., Lund University	Examinatrice
Virginie CHAMARD	DR. Institut Fresnel, Aix-Marseille Université	Examinatrice
Alessandro COATI	Dr., Synchrotron SOLEIL	Directeur de thèse
Marie-Ingrid RICHARD	Dr., CEA Grenoble	Co-Directrice de thèse
Andrea RESTA	Dr., Synchrotron SOLEIL	Co-encadrant de thèse

Vous êtes cordialement invités au pot qui suivra

SYNCHROTRON SOLEIL
L'Orme des merisiers – Route départementale 128 - 91190 Saint-Aubin
www.synchrotron-soleil.fr/fr/evenements
CONTACT : sandrine.vasseur@synchrotron-soleil.fr