"Nanocomposites and nanomaterials"

The Effect of Temperature on Crystal Lattice of Palladium Nanoparticles in Supercritical Carbondioxide Deposition Method

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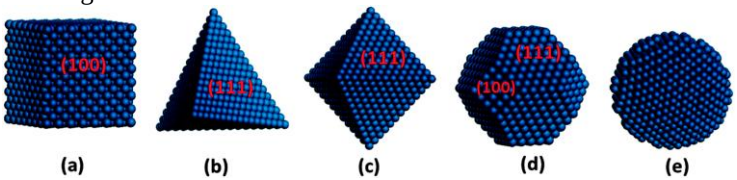
Metal nanoparticles supported on high surface area solid support are used extensively as catalysts for a wide variety of reactions. There are many factors that influence the catalytic activity of metal nanoparticles. One of the factors affecting the catalytic activities of metal nanoparticles is the crystal lattice of nanoparticles. In particular, the number of atoms on the surface in the crystal lattice, the arrangement of the atoms in the edges and corners affect the catalytic activity [1]. Some factors such as preparation method of the nanoparticle, used precursors and the experimental conditions affected to the crystal lattice. By changing these factors, the crystal lattice, morphology and surface properties of the nanoparticles can be changed.



In this study, the preparation of SBA-15 supported palladium catalysts using a novel precursor, 1,10-phenantrolinedichloro palladium(II) (Pd(PTQ)Cl2), using a supercritical carbon dioxide deposition method is reported. The effect of temperature variation at constant pressure on the crystal lattice is investigated. Supported Pd nanoparticles were characterized by transmission electron microscopy (TEM) and X-ray diffraction (XRD). XRD patterns showed that the size of nanoparticles changes between 2 and 10 nm. TEM and XRD spectrum showed that the particle size and the amount of deposition increased by changing temperature at constant pressure. It has also been observed that the temperature directly affects the crystal lattice.

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2. *Corma A., Garcia H., Levya A., J. Mol. Catal. A: Chem.-2005, **-230**,* 97–105.