

# **ON THE CHANGES IN THE CRYSTALLINE NATURE OF SUPPORT AS A RESULT OF METAL LOADING**

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( Dated 1 July 2009)

It is known that one often records the XRD of the support and also after the supported metal or other species on loaded on the support. It is always considered that the XRD after the active phase is loaded, it natural to expect and look for the presence of characteristic diffraction pattern of the supported phase (most of often the metal peak in XRD patterns) and it is not usual to consider how the original diffraction pattern of the support has changed.

But this is also another important indication to show how the supported phase affects the supporting phase.

In this short presentation we wish to place some points for consideration and in a later write up we wish to examine some of the XRD patterns that are reported in literature.

When a species is supported on a support the following can happen.

1. The supported phase can be completely dispersed only on the surface
2. The supported phase not only dispersed on the surface but also is dissolved into the support phase
3. The support can act as a solid solvent for the supporting phase.
4. Some new phases can also result.

What ever may be the mode in which the supporting phase interacts with the supported phase, there has to be some change in the XRD pattern of the supporting phase as compared to the unsupported state of the support.

The effect manifest in the following ways in the observed XRD patterns:

1. The peak positions can change indicating that either the supported phase has got incorporated into the lattice of the support or a new compound is formed as a result of the support and the material that is getting supported on it.
2. The intensities of the peaks have changed but the peak positions remain the same. Is this an indication of the good dispersion?
3. The intensities of the original peaks change but new diffraction lines appear due to the supported phase. This indicates that the supported phase is well dispersed and the supported phase is distinct from the phase on which it is supported.

4. The intensities of the peaks of both the phases change. This has a special meaning that the phase that is supported alters the crystalline nature of the support itself. Why and how does the crystalline nature of the support is altered by the phase that is getting supported is a question to be carefully analyzed in a subsequent presentation.

{It is our intention that we shall take up all these issues for discussion and come up with some useful concepts in this subject. Anyone if you have any idea can also present them}