289x Preparation of Supported Catalysts: Effect of pH

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Modeling and experiments have been carried out in order to investigate the impact of pH during the preparation of impregnation catalysts. It is well known that the pH of the impregnating solution determines the amount and adsorption strength of the adsorbed metal, as well as its chemical structure. All the studies dealing with the preparation of supported catalysts have attempted to correlate the pH of the impregnating solution to the final characteristics of the supported catalyst (metal profile, metal dispersion, chemical structure of the active metal). However, up to now the variation of pH within the porous support during the preparation process and its effect on the immediate environment of the adsorbed metal remains unknown. Our goal is to deepen our fundamental understanding of the impact of pH, so that, it can closely be controlled and eventually used to obtain the desired metal properties.

To achieve this goal, we have developed a transport model describing the impregnation stage, where the adsorption of metal onto the solid support is described by the Revised Physical Adsorption (RPA) model developed by Regalbuto's group. The results show that the pH front moves towards the pellet center more rapidly than the metal front. The metal distribution within the support is function of the local pH and the impregnating time. Experiments carried out on a Ni/Al2O3 system shows good agreement with the model.