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Development of Acetic Acid Production Process Catalyzed by Rhodium Complex Immobilized to Pyridine Polymer Support

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In the field of industrial production of acetic acid *via* methanol carbonylation, the higher yield and efficiency are still pursued by employing the low water reaction system. Rhodium complex catalyst bound to pyridine resin exhibited high carbonylation activity and excellent immobilization characteristics under low water conditions, while strong durability is required for industrial use. In this connection, robust pyridine resin is essential under elevated reaction conditions. The relationship between durability and crosslinkage, and pore structure of resin was studied, as a result, novel pyridine resin resistant to industrial use has developed. Decomposition rate was evaluated based on the amount of pyridine group leached out from the resin and attrition rate was measured by the amount of powder generated by collision of resin beads each others in stirring liquid. The constant activity of rhodium complex catalyst bound to the novel pyridine resin during more than 7000 h was demonstrated using a continuous flow reactor unit. In addition, using an integrated pilot plant, byproducts could be recycled by equilibrium control and process performance including yields associated with catalyst activity, selectivity and stability in long term was demonstrated.

Keywords: Rhodium complex catalyst, Immobilization, Polymer support, Acetic acid production, Catalyst life, Pilot plant

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