

# Effect of poison on the performance of precious metal based polymer hydrogenation catalysts

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Styrenic Block copolymers, such as PS-PMMA (Polystyrene-methyl methacrylate), SBS (polystyrene-butadiene-styrene), SIBS (polystyrene-isobutylene-styrene) and SIS (polystyrene-isoprene-styrene), are some of the most usable and fastest growing materials in the TPE family. However, the unsaturated functional groups, such as polyolefin and polystyrene, are not stable to heat, chemicals and UV have restricted their high end applications. Furthermore, the smell of these materials due to the presence of unsaturation also restricted their high end applications. In order to alleviate these application problems, hydrogenation is commonly practices to improve the application value of these materials. New polymer materials can be produced by simply employing hydrogenation reaction which is otherwise very difficult to prepare by polymerization reactions. As a result, hydrogenation has become a facile method to improve the value and quality of block copolymers. Current commercial styrenic block copolymer hydrogenation uses homogeneous catalyst, such as Ziegler catalyst, which are very difficult to separate after reaction. As a result, de-ash process is needed in order to separate the product from the catalyst. The de-ash process is not only very expensive but also creates a lot of waste solvent. The use of heterogeneous catalyst as an alternative has been sought for a long time and so far no commercially viable heterogeneous catalysts have been discovered. Precious metal catalysts are most active for the hydrogenation of block copolymers. However, catalyst poisoning by impurities, such as Li polymerization catalyst and polar compounds, in the polymer has been a major problem to the use of precious metal based catalysts. The current study explores the effect on polymer impurities on the activity of precious metal catalysts. Details concerning the effects of impurities and purification methods on catalyst activity will be revealed.

Keywords: Heterogeneous catalyst; precious metal, styrenic block copolymer, poison, purification

報告型式：☐口頭 ☒海報 ☐皆可

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