

Feasibility Study of Waste Recycle in Perhydropolysiloxazane Synthesis for using Semiconductor Processing Materials

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In semiconductor manufacturing process, a small amount of process materials such as PR/Hardmask is used to produce semiconductor from one wafer while many kinds of process materials are required. Therefore, production plant for process material needs small quantity batch production systems. It is required for these systems to improve the productivity and to reduce the production cost. Nowadays, perhydropolysiloxazane (PHPS) solution, one of the process materials, is used for producing silicon oxide film. PHPS can be synthesized ammonia & dichlorosilane reaction with pyridine solvent. But this reaction produced ammonium chloride that cause some problem when used semiconductor manufacturing process. So much amount of solvent as pyridine, xylene is needed when produced pure SOD coating solution. In the production system of PHPS solution, the amount of pyridine and xylene are needed over twenty times more than that of PHPS solution. The cost of pyridine and Xylene accounts for a large portion of the total production cost. In this study, the regeneration process of organic solvent waste from the production process of PHPS is suggested and economic analysis is performed.