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Electrocoagulation of chemical mechanical polishing wastewater

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Abstract

Treatment of chemical mechanical polishing (CMP) wastewater was investigated. The CMP wastewater, as obtained from surface treatment of photovoltaic wafers, was characterized by high suspended solids, high nephelometric turbidity unit (NTU), chemical oxygen demand (COD) and green color. This study determines the feasibility of CMP wastewater treatment by the electrocoagulation process. The COD concentration of the CMP wastewater was found in the range of 700 mg/l which is below the discharge standards. The analysis of the wastewater before and after electrocoagulation shows that the electrochemical process was a total barrier for the metal species, color and a significant reduction in the concentration of the fluoride and sulfate ions.

Keywords: Electrocoagulation; Chemical mechanical polishing wastewater; Wafer

1. Introduction

Manufacturing of semiconductors involves numerous highly complex processes. Metallization of silicon wafers is one of the key steps in the manufacturing of photovoltaic wafer [1]. To reduce wafer topological imperfections and improve the depth-of-focus of lithography processes, today the CMP process has been widely adopted in the semiconductor industry. CMP is considered as dirty process in the clean rooms. Unlike in most semiconductor processes, the wafer subjected to CMP is covered with particles from both the polishing slurry and the wafer itself. These undesirable particles have to be cleaned before the wafer can proceed to remaining steps of chip fabrication.

Generally, a high volume of UPW is needed for post-CMP cleaning [2]. The ultra-pure water

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