

Voltammetric Study of Anodic and Cathodic Phenomena
on Graphite in Cryolite-Silica Melt

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Wide application of solar energy is very limited through end of 20th century, because its cost is not competitive with conventional energy resources. High price of solar grade silicon caused by limited supply has become the bottlenecks of the photovoltaic industry to achieve its much anticipated growth. It is thus essential to develop a method for fabrication of solar silicon, which is energy efficient and will deliver inexpensive feedstock material. The electrodeposition of Si from cryolite based electrolyte counts as a green silicon making process, which uses a clean source of energy to decompose SiO₂ to Si and industrial O₂.

The decomposition potential of SiO₂ on the candidate cathode, graphite, is fundamental information that should be measured before the actual deposition process to avoid the co-deposition of impurities; therefore, the potential was measured by cyclic voltammetry, and the results will be presented in this paper. The effect of SiO₂ concentration on the potential was also be investigated to predict the change of potential during the actual deposition process, where the SiO₂ concentration changes by time. The anodic and cathodic reactions which are happening on the surface of electrodes will also be studied using the recorded voltagrams.