From Metallurgical-Grade to Solar-Grade Silicon: An Overview

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Abstract

The non-renewable nature of fossil fuels as an energy source means its future availability is a cause for concern. The world's energy demand is ever increasing and there is a growing interest in finding alternative renewable, environmentally benign and cheap energy sources like solar energy. This has resulted in the shortage of silicon feedstock for the photovoltaic industry. This is mainly due to the non-availability of a dedicated solar silicon production and the growing demand for silicon feedstock. There has been tremendous research in a quest to develop methods for the production of solar-grade silicon in a cheap and environmentally friendly way. The metallurgical and chemical routes for the production of solar-grade silicon from metallurgical-grade silicon have evolved. The chemical methods are the most researched ones and they are mostly preferred than the metallurgical ones since the former are capable of producing silicon of higher purity. This review discusses some of the available methods so far for the production of solar-grade silicon using metallurgical-grade silicon as a starting material.