Development of Solar Grade Silicon (SoG-Si) Feedstock by Recycling SoG-Si Wastes

Investigators: Lifeng Zhang (zhanglife@mst.edu), David Joyce (Cystal Systems, Inc.)

Founding source: Department of Energy (DOE) and Missouri S&T

Project description:
The objective of the proposed work is to develop Solar-Grade Silicon (SoG-Si) feedstock for crystalline wafers and cells by recycling the top-cut scraps and the sawing slurry wastes of SoG-Si, using low-cost, environmental-friendly, efficient and fast processes. On a technological level, the current project is to develop technologies and processes to recycle 100% of the top-cut scraps and at least 90% of the sawing slurry. The project developments should allow PV industries and SoG-Si producers to reduce their current ~10 tons of Si wastes per MW produced PV power (MWp) to ~1 ton silicon/MWp, and increase the SoG-Si feedstock by ~40%, by which the price of solar cells will be lowered by ~$0.4/Wp, accounting for 13% reduction.

Fig.1 Particles in silicon (left) and Principle of EM separation of inclusions from the molten metal (right)

Publications: