



SEMINAR

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Green recycling route for Sm-Co permanent magnet swarf

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Permanent magnets (PM) have a wide range of applications and play an important role in the realization of a sustainable future. With the increasing demand for green and renewable energy production and sustainability, comes a rise in popularity and demand for electric vehicles (EV) and hybrid electric vehicles (HEV) which use permanent magnet-driven electric motors. However; the development of technology and shrinking dimensions of parts used for such technologies has made post-processing and machining of the bulk PMs inevitable. This, in turn, leads to a 30% waste of the magnetic material as swarf/rejects. PMs are made of a combination of Rare Earth Elements (REE), transition metals (TM) and, some other elements. The scarcity of the REEs and volatile and unstable price of the TM market (especially Cobalt) has pushed the EU to encourage scientists to come up with feasible methods to revive the mentioned waste and thus achieve a circular economy and guarantee sustainable energy production and by doing that help the EU to achieve its Green Deal Initiative goal set for 2050. The recycling of Samarium-Cobalt (Sm-Co) permanent magnets has been the target of a number of scientific studies, however; the proposed methods are all very energy-intensive and require a lot of mineral acids, and generate a huge amount of wastewater during the process. Within the scope of this study we investigate an eco-friendly method based on electro-deoxidation of the oxidized magnet swarf which will require much less energy consumption and will require a negligible amount of acids and chemicals compared to the conventional methods.

Kindly invited.