

## Séminaire ICSM

Institut de Chimie Séparative de Marcoule / CEA Marcoule  
(UMR 5257, CEA, CNRS, Université Montpellier, ENSCM)

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CSIR-National Metallurgical Laboratory (Jamshedpur, Inde)

donnera un séminaire intitulé

### **Sustainable Process Development for the Extraction of Rare earths from Magnet**

le jeudi 19 septembre 2019 à 14h30

en salle Mezzanine

The rare earths permanent magnet is used in various modern technologies such as mobile phones, magnetic separators, motors, MRI machines, generators of wind turbines etc. Due to their superior magnetic properties, the NdFeB magnet industry is growing worldwide with 20% rate per year. NdFeB magnet comprised of ~30 wt.% of rare earth metals (Nd, Pr, Dy) and 63-67% of iron. The occurrence of rare earths metals in natural deposits are scattered and in low concentration, which generated huge overburden during their excavation. Apart from that, the extraction and separation of individual or desired rare earth metals from natural deposits requires multi-stage operation. In this scenario, the end-of-life magnets have huge potential to be utilized for the recovery of rare earth metals. This presentation relates to the development study of different processes for sustainable recovery of rare earths. In the conventional method, concentrated mineral acids used for recovery of rare earths. The discharge of these chemicals have adverse effect on the environment. Also, 20-30% of rare earths value lost in these process during iron removal step. This presentation focused on the development of an energy efficient and eco-friendly process for the recycling of valuable metals from waste NdFeB magnets. In one approach, the selective extraction of rare earths is explored by following oxidative roasting step (850°C) and consecutive leaching in mineral as well as organic acid. In another approach, chloridizing roasting and water leaching route is discussed to minimize the roasting temperature and avoid the usage of acid during leaching. The presentation also includes the direct electrochemical leaching of magnet for recovery of valuable metals. Overall, different process chemical and electrochemical route is compared and summarized for the rare earth recovery.

