Abstract Volume

National Seminar
on
75 years of Mineral Exploration and Future Challenges in India

MEFCI-2022

Organised by:

ATOMIC MINERALS DIRECTORATE FOR EXPLORATION AND RESEARCH
HYDERABAD
&
GEOLOGICAL SOCIETY OF INDIA, BENGALURU

आज़ादी का अमृत महोत्सव

ATOMIC MINERALS DIRECTORATE FOR EXPLORATION AND RESEARCH
Hyderabad
April 5-6, 2022

National Seminar
on
75 years of Mineral Exploration and Future Challenges in India
MEFCI-2022

April 5-6, 2022

Abstract Volume

आज़ादी का अमृत महोत्सव

Organised by:

Atomic Minerals Directorate for Exploration and Research, Hyderabad
and
Geological Society of India, Bengaluru

CHARACTERIZATION AND LEACHING OF RARE EARTH ELEMENTS FROM INDIAN COAL ASH

Bappaditya Das, Rajen Kundu* and Sanchita Chakravarty
CSIR-National Metallurgical Laboratory, Jamshedpur
*E-mail: kundu.rajen@nmlindia.org

ABSTRACT

Consumption of critical elements is increasing day by day with the advancement of modern science and technology. Many of the rare earth elements belong to the class of critical elements and play a pivotal role in modern society. Neodymium (Nd), Europium (Eu), Terbium (Tb), Dysprosium (Dy) and Yttrium (Y) are considered as critical rare earth elements (CREE) for both the short and long term perspective. Lanthanum (La) and Cerium (Ce) are considered as near critical rare earths. To meet the demand in light of restricted distribution of these critical elements worldwide, it is necessary to recover them from secondary resources. Coal ash is an abundant industrial by product of coal combustion due to its large-scale reserves and low cost for energy production. Coal ash is a very good source for critical elements as it contains valuable rare earth elements. A few ventures have been reported to recover rare earth elements (REEs) from coal-related ash materials in recent years. In this work a leaching study on two ash samples, formed by the combustion of carbonaceous coal is carried out. The coal samples were taken from the coal mines of eastern region, India. One ash sample contains around 500 ppm REEs, named as Low Total REEs Ash (LTRA) and the other contains around 1000 ppm REEs, named High Total REEs Ash (HTRA). The leaching study was carried out in presence of two different types of acid, i.e. nitric acid (mineral acid) and acetic acid (monocarboxylic acid). The leaching efficiency was measured by Inductively Coupled Plasma Mass Spectrometry (ICP-MS) analysis of the leached solution. For both types of ash samples (LTRA and HTRA), REEs leaching efficiency was observed around 70% in nitric acid. In the case of acetic acid, around 30% REEs leaching efficiency was observed for Low Total REEs Ash sample. However, it is observed that, only 40-45% leaching efficiency was there for the High Total REE Ash sample in organic acid.