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The composition of rare earth element in deep-seabed mineral deposits

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Korea has carried out several explorations in order to delineate rare-metal bearing resources in deep seabed. Rare-metal bearing seabed mineral resources which Korea has explored are categorized into major four types of deposit; polymetallic nodules, Co-rich crusts, seafloor massive sulfides and deep seabed sediments. Total rare earth oxide (TREO) contents in polymetallic nodules range from 0.037 to 0.302 REO % with mean value of 0.12 REO %. Co-rich crusts show as high grades as polymetallic nodules (0.013 to 0.387 REO %, average = 0.18 REO %). Other rare metals such like Te and Pt are enriched elements in Co-rich crusts, displaying enrichment factors (EF) of 10,800 and 150, respectively. Se as well as In are highly enriched elements in seafloor massive sulfides (EF=1,300 and EF=110, respectively), whereas REE's contents are very low. TREO contents in REE-bearing sediments, which is recently recognized as a possible REE resource, range from 0.024 to 0.115 %, showing little bit lower grade than polymetallic nodules and Co-rich crusts. The rare metals extracted from nodules and crusts will add economic values to conventional commodities such as Co, Ni and Cu. The deep-sea sediments are likely to be a rare metal resource of which type is a low-grade and large tonnage deposit.