RECOVERY OF RARE EARTHS FROM EXHAUSTED CATALYSTS OF PETROLEUM CRACKING

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The rare earthelements(RE)are remarkablyimportant for high technology industry, withapplications invehicles, magnetic materials, biological systems, catalysts and several other quotidian devices.

The largestproducer of REin the world is Chine,witch whichresponds for approximately 90% of the production and for then yours consumption is around 70% of the consumption of these elements. Due to this monopoly, mining industries around the world were closed in the last decades, since it was more advantageous to import RE from Chine than exploring their mineral reserves.

However, in the last years, Chine has largely increased the price of RE, in more than 10 times in some occasions. Therefore, it has become necessary to develop new environment friendly methodologies for the recovery of RE from discarded magnets, catalysts, fluorescents lamps, and other deactivated devices, in order to provide the reuse of the RE elements and to give an adequate destination to the residues.

In this sense, this work reports the recovery of rare earth elements from Fluid CrackingCatalysts (FCC) by using a non-aggressive and sustainable methodology. For this, an extraction with ions exchange resins, strong acid, was used in adequate conditions.The residual solid was then separated from the RE-rich resin. So the RE was replaced of resin using an solution of HCl, thereforethe RE-rich solutionhad oxalic acid added for the recuperation of the RE's. The solid is finally calcinated at 900 °C for 1 h in for the conversion of oxalates into RE oxides, thus resulting in recuperation yields around 70%.

The XRD and EDS analyses, as well as complexometry results, show that the recovered solid is essentiality lanthanum oxide, thus indicating that the proposed method is very convenient for recovery rare earths from FCC catalysts.

References

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