

## ABSTRACT

Nickel and Co/Mo spent catalysts are considered as secondary sources of nickel, cobalt and molybdenum respectively. An economically and ecofriendly method was developed for the recovery of these metals. A traditional method was followed i.e. crushing, roasting, leaching and crystallization. But the smartness of the process is its cheapness and sustainability. Both spent catalysts were crushed and followed by roasting to remove the volatile impurities. The roasted sample of nickel catalyst was leached into 4M  $\text{H}_2\text{SO}_4$  solution and 10% v/v  $\text{H}_2\text{O}_2$  was added as oxidizing agent. The leached solution was heated ( $100^\circ\text{C}$ - $120^\circ\text{C}$ ) and stirred for 3hrs. It was filtered and adjust the pH at 5 by addition of lime. The alumina and other unwanted metals were removed in the form of residue. Nickel metal was recovered in the form of  $\text{NiSO}_4 \cdot 6\text{H}_2\text{O}$  with 98%-99% purity, while Co/Mo spent catalyst was leached into conc.  $\text{HNO}_3$ , added  $\text{H}_2\text{O}_2$ , heated and stirred for 3-4 hrs. The solution was filtered, Co leached into filtrate, while Mo remained in residue. Cobalt was recovered from filtrate at pH 8 by addition of NaOH. The samples were analyzed by ICP and XRF techniques.