Characterization of Oil-based and Water-based Magnetic Fluids from the Spent Catalyst

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Magnetic fluids have been investigated and applied widely for recently years. The magnetic fluids are immense industrial importance in vacuum seal, hard disk driver exclusion seal and even medical applications [1-3]. The magnetic fluids can be divided into two groups of oil-based and water-based magnetic fluids depending on which carriers are used.

We investigated a new method that the magnetic fluids were prepared with the spent iron oxide catalyst by mechanochemically [4]. This method is very economical process, because the spent catalyst with composition of 77%of magnetite (Fe_3O_4) and 15% of alkali is very suitable to prepare the magnetic fluids.

In order to expand the applications of the magnetic fluids, we prepared two different types of magnetic fluids by VSM, XRD, TEM and TG-DTA, and compared the characterization of oil based with them of water based magnetic fluids. The average size value of magnetic particles in the magnetic fluids is about 15nm. Magnetization of the magnetic fluids is 30 emu/g at the external field of 10 KOe. This magnetization value is sufficient to apply to the separation of each nonferrous metal such as Al, Zn, Cu, Pb etc. the mixed metals scrap by controlling the external magnetic field with these magnetic fluids.

References

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