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Recent progress in recycling of Nd-Fe-B permanent magnets wastes

Nd-Fe-B permanent magnets have been widely used in both high-tech devices and conventional appliances. Moreover, with the fast development of some green-energy technologies, the consumption of Nd-Fe-B magnets is expected to double or even triple in the near future [1]. As a result, the global proved reserves of some key rare earth elements exhibit an annual decrease, which in turn results in price hikes for these elements and concerns about the shortage of resource supplies. It is worth to mention that large amount of waste materials were generated through the electronic wastes and fabrication process of Nd-Fe-B. The waste materials, which were composed of sintered Nd-Fe-B magnet bulks and severely contaminated sludge, as well as bonded magnets, are valuable secondary resources of rare earth. In current papers, we report the progress in recycling of Nd-Fe-B permanent magnets wastes with the emphasis of our recent studies on large batch (up to 800 kg/batch) Nd-Fe-B sintered magnet wastes recycling, severely contaminated Nd-Fe-B sludge recycling, and Nd-Fe-B bonded magnet wastes recycling. Upon these studies and their final applications in industry, the consumption of valuable natural rare earth resources was expected to reduced and preserved in the future.