Trend in Research and Development Related to Permanent Magnets for Solving Rare-earth Resources Problem

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Since Nd-Fe-B magnet was first synthesized in 1983, many new applications have emerged in the past two decades. With regard to motor market, it will expand because of strong energy saving requirements from the automobile and electric application markets. Especially, permanent magnet motors for hybrid and electric vehicles are drawing great attention and the usage of Nd-Fe-B magnets will increase all the more hereafter. There is, however, a serious problem as motors in such eco-friendly cars are said to operate in high temperatures of about 200℃. Nd-Fe-B magnet has a drawback of dramatically decreasing coercive force with the rise of temperature. In order to improve this aspect. the best way is to add dysprosium (Dy) into the magnet. So, Dy has become an essential element for Nd-Fe-B high-performance magnet as it helps to maintain coercive force even at high temperatures.

On the other hand, the rare earth resources in the earth crust are eccentrically-located and its majority is produced in China. There is a need to reduce its usage as, especially compared to light rare earth elements as neodymium (Nd) and samarium (Sm), heavy rare earth elements including Dy are unevenly distributed to a dramatic degree, their output low, and their prices are about 10 times that of Nd.

The present presentation includes a summary of the trend in research and development of permanent magnets to solve rare-earth resources problem.

참고문헌

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