

Theoretical Development of Soft and Hard Magnetic Materials and Characterization by Mössbauer Spectroscopy

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Cars powered by internal combustion engines (ICEs) will be phased out to reduce fuel emissions, thereby addressing global warming and air pollution issues in the cities and improving fuel economy. J. P. Morgan recently reported that by 2030, the market share of electric vehicles (EVs) and hybrid electric vehicles (HEVs) would account for an estimated 60 % of all cars [1]. In response to this trend, electric vehicles need compact, low-cost, lightweight electric motors' high efficiency and corresponding power electronics.

Permanent and soft magnets constitute about 70% of an electric motor cost for an EV. Power electronics such as converter need high permeability and saturation magnetization of soft magnetic materials to save energy and reduce the power device's size. This presentation will introduce theoretical methods to develop magnetic materials and Mossbauer characterization of permanent and soft magnetic materials. Lastly, future target properties of permanent and soft magnetic materials are suggested.

[1] <https://www.jpmorgan.com/global/research/electric-vehicles>

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