

Atomic Scale Design of Magnetic Materials for Electric Machine and Telecommunication Devices

Yang-Ki Hong^{1*}, Jihoon Park¹, Woncheol Lee¹ and Jaejin Lee²

¹Department of Electrical and Computer Engineering and MINT Center
The University of Alabama, Tuscaloosa, Alabama 35487, USA

²Client Research and Development, Intel Corporation, Hillsboro, Oregon 97124, USA

Global market for soft magnetic materials is estimated to reach \$66.6 Billion by 2019 [the iRAP report], and the market for permanent magnetic materials will reach \$15 Billion by 2018.

The first part of this talk covers the applications of magnetic materials to motor for future electric vehicles and telecommunication components such as self-biased GHz hexaferrite circulator, miniature ferrite MHz-GHz antenna, and low-power MHz ferrite inductors. The second part focuses on the electronic structure of magnetic materials, emphasizing ferrites, rare-earth free permanent and nanocrystalline soft magnets.