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Compact motor with new material which halves axial direction length & improves efficiency by 5%

Realizing a practical powder magnetic core with five times conventional strength



Figure 1. Powder magnetic core developed



Figure 2. Compact motor employing the powder magnetic core

Hitachi, Ltd., Hitachi Powdered Metals Co., Ltd., and Hitachi Industrial Equipment Systems Co., Ltd. have co-developed compact motor technology by employing highly pressurized iron powder to form a powder magnetic core in coil of a motor. Iron powder is known for its usefulness in forming arbitrary shapes. The technology developed includes a special heat process to increase the strength of the powder magnetic core, optimization of the shape of the core to suit compact motors, reduction redundant space in the motor such as at the end of the magnetic coils. When a prototype industrial motor with a power output of 100W was created with this technology, it was found that axial length could be reduced by a half and that motor efficiency was improved by 5% compared to conventional motors.

This technology is expected to further the development of compact and lightweight motors which are used in a wide range of areas from industrial equipment, consumer appliances, to vehicles. Further, the structure of the motor developed allows it to be easily disassembled into its components facilitating the recycling of materials such as copper.

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A part of this development is based on the results of collaborative research with the Tohoku University Graduate School of Engineering and Kanazawa Institute of Technology School of Engineering.