

Project Title: International Joint Research and Development of Post-Electromagnetic Steel Sheets for High-Frequency Applications Using Innovative Processes (2023—2026*)

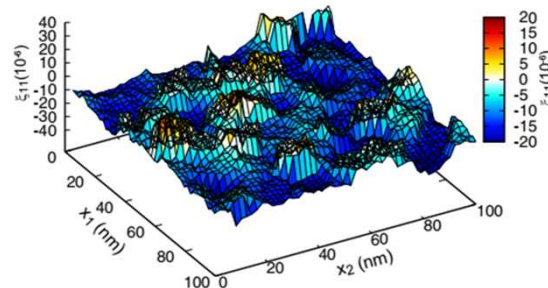
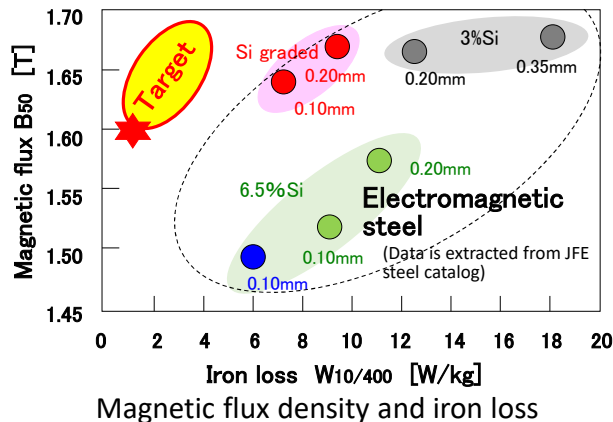
*scheduled



Entrusted Party: Tohoku University

Outline of the Project

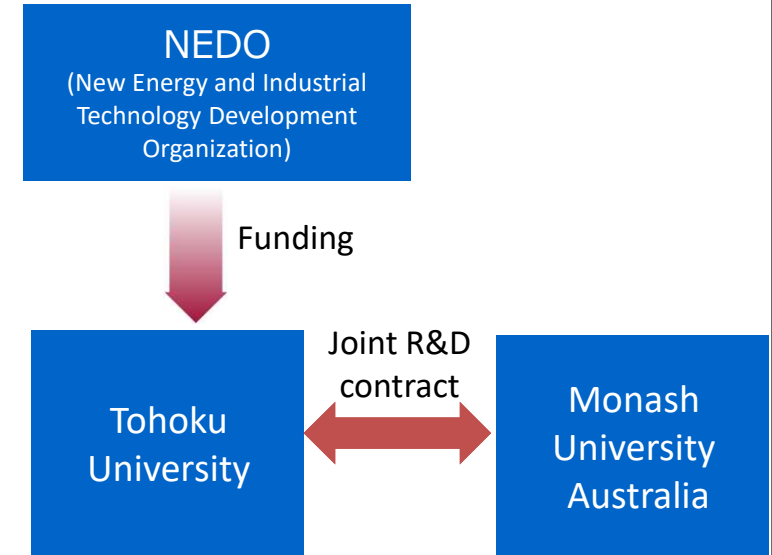
For green mobile technologies, it is very important to reduce the size and weight of electric motors. To achieve this, a soft magnetic material with high magnetic flux density and low loss at high-frequencies is strongly required, but this is a difficult task for the present electromagnetic steel sheets. This project undertakes to develop a new nanocrystalline alloy to meet the above requirements as a post-electromagnetic steel sheet. The key points are low magnetostriction, which has not had much attention paid to it so far, and ultra-rapid annealing technology, which exceeds the conventional material design range.



Significance of International R&D

Nanocrystalline alloys using ultra-rapid annealing technology have been developed at Monash University in Australia. Tohoku University and domestic collaborators have been conducting experimental and theoretical analyses on the effects of magnetostriction to reduce loss in a high-frequency range. In this international joint research, these two approaches are integrated to develop an innovative nanocrystalline alloy as post-electromagnetic steel sheets.

Project Scheme



Expected Outcomes

- Estimated CO₂ emission reductions = 420,000 tons/year (based on HEV/HV forecast for 2040)
- Estimated economic benefits = 22 billion JPY of electrical consumption reduction