



School of Materials Science and Engineering



Seminar Topic:
FeCo-2V Soft Magnetic Alloys for Electrical Machine Applications

Associate Professor Oh Joo Tien

Abstract

The increasing importance of electric cars and more electric aircraft (MEA) engines poses critical requirements for the soft magnetic materials used in the manufacturing of the rotor and stator of electrical machines. This talk presents the basics of soft magnetic materials for electrical machinery, engineering approaches in electrical machines and needs for future research.

This talk will also present results of the work on FeCo alloy. FeCo is a potential candidate to meet the critical requirements due to its excellent magnetic performance with the highest saturation magnetization of 2.3 T, the highest Curie temperature of 980 °C, the low core loss and coercivity, as well as the almost zero of magnetostriction and magnetic anisotropy. In general manufacturing process, FeCo sheets are fabricated by mechanical punching followed by annealing and assembling. Previous research revealed that the manufacturing process induced plastic deformation and residual stress along the edge of the laminates resulting in inferior magnetic properties. The current work examines how the effect of plastic deformation are mitigated by heat treatment. Investigation of three machining methods (punching, laser cutting, and EDM) on the magnetic properties and microstructure of FeCo-2V alloy laminates will be presented.

Biography

Dr Oh obtained his first degree in Materials Engineering from Queen Mary College, University of London in 1981. He worked in the Steel and Metallurgical Industry for a number of years before joining Nanyang Technological University in 1991. He obtained his PhD in Materials Science and Engineering from Nanyang Technological University in 2000. Dr Oh worked mainly in the area of magnetic materials. He is currently working on a Roll-Royce Corp Lab funded project on Soft Magnetic Materials for Aerospace Application.

Wednesday, 11 March 2020 || Time: 3:00 pm – 4:00 pm||

Venue: MSE Meeting Room (N4.1-01-28)

Hosted by: Dr Long Yi