Contribution ID: **311** Type: **Oral Presentation**

Property and structural characterisation of Fe and Ni bonded NbC cermets for improved tribological applications

Monday, 4 July 2022 11:45 (15 minutes)

NbC cermets with Fe and Ni binders have been vacuum sintered with molybdenum carbide additives for improved high temperature tribological applications. The magnetic, electrical and thermal properties are being investigated using Mössbauer spectroscopy and the Physical Property measurement system (PPMS). The addition of 4wt% molybdenum carbide to the Fe and Ni binder grades shows an average increase of 12% in the hardness of the cermets with little compromise in the fracture toughness property. The Mössbauer spectrum of the NbC-12Fe grade shows the presence of ferromagnetic phases in the binder. The binder of the NbC-12FeNi spectrum is dominated by a paramagnetic phase and a minor ferromagnetic phase. The addition of molybdenum carbide to NbC-FeNi composite results in a completely paramagnetic structure which can be ascribed to gamma-FeNi. The spectrum for NbC-Fe with added molybdenum carbide is dominated by two ferromagnetic phases consistent with the hysteresis curves obtained by PPMS. The observed phases and properties are also being investigated using X-ray diffraction in combination with high resolution microscopy (SEM, TEM and STEM).

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

PhD

Primary author: PETERS, Gerrard (University of the Witwatersrand)

Co-authors: Prof. NAIDOO, Deena (School of Physics, University of the Witwatersrand); Prof. GENGA, Rodney (University of the Witwatersrand); Prof. WAMWANGI, Daniel (School of Physics, Materials Physics Research Institute, University of the Witwatersrand); Dr NGONGO, Sinoyolo (Nelson Mandela University)

Presenter: PETERS, Gerrard (University of the Witwatersrand)

Session Classification: Physics of Condensed Matter and Materials

Track Classification: Track A - Physics of Condensed Matter and Materials