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Low Temperature Transport of HTR Nuclear fuel Composite Graphite

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Abstract content
   (Max 300 words)

Low temperature transport measurements of materials give the opportunity to examine the impurity contributions to these properties which will lead to understanding the purity of materials. In this study we examine low thermal resistivity as well as Seebeck coefficient properties of graphite composite composing of 64 wt% of natural graphite, 16 wt% of synthetic graphite and 20 wt% of phenolic resin binder heat treated at 1800 °C has been used to encapsulate the TRISO coated fuel particle in the PBMR and considered to serve in the initial state of reactor moderation as well as heat conduction. The comparison will be made of these properties for both pristine and irradiated samples with protons to access the contribution of the irradiation damage due to these properties. Thermal conductivity, electrical resistivity and Seebeck coefficient were investigated at low temperature using physical property measuring system (PPMS). The structural disorder of the composite was also investigated using Raman spectroscopy, x-ray diffraction (XRD), whilst the penetration depth of irradiation within the sample was estimated using SRIM programme. Our thermal measurements can be well represented by two graphite model consisting of non-graphitized and graphitized graphite which allows us to treat our total thermal resistance as made from serial connection of these two contributions.

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Yes

Level for award
 (Hons, MSc,
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Msc

Main supervisor (name and email)
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No

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