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**Probing Fillers In The Polymer Blend Composite: A New Approach**

Hafizal Yazid

Malaysian Nuclear Agency (Nuclear Malaysia), Bangi, 43000 Kajang,  
Selangor Darul Ehsan, MALAYSIA

[hafizal@nm.gov.my](mailto:hafizal@nm.gov.my)

**ABSTRACT**

We have demonstrated the use of XRD and thermal measurements to diligently probe the location of nano-scaled Boron Carbide fillers. Herein, the XRD diffraction of Bragg and amorphous peaks was successfully fitted from the parameters determined by a deconvolution process using the Pearson VII function, and the fitting error was less than 4%wt}. Thermal measurement was achieved by measuring the thermal conductivity of the composite. 4%wt of filler loading was found as a threshold. Beyond this value, a significant increase in thermal conductivity was observed. There was no further decrease in HDPE crystallinity above the threshold, but rather a considerable increase. Below the threshold value, the addition of fillers disturbed the HDPE crystall arrangement, leading to a reduction of both HDPE crystallinity and thermal conductivity. The influence of ordered structure, intrinsic thermal conductivity, radius of gyration of fillers, and their interactions, elucidated the trend of the thermal conductivity