



Abstract

This study presents a comprehensive investigation into the synthesis and characterization of a novel class of poly(ether ether ketone) (PEEK)-based polymer nanocomposites. The polymer was synthesized via solution-phase polymerization of 4,4'-bis(4-phenyl)-4,4'-diphenylbenzophenone (BPP) and 4,4'-bis(4-phenyl)-4,4'-diphenylbenzophenone-2,6-naphthalene diimide (BPNDI). The resulting polymer, designated as PEEK-BPPNDI, exhibits a glass transition temperature (T_g) of approximately 250 °C and a melting temperature (T_m) of approximately 350 °C. The mechanical properties of the polymer were evaluated using tensile testing, and the results indicated a significant increase in tensile strength and modulus compared to the base PEEK polymer. The thermal stability of the polymer was assessed using thermogravimetric analysis (TGA), which showed a weight loss onset temperature of approximately 450 °C. The morphology of the polymer was characterized using scanning electron microscopy (SEM), which revealed a highly cross-linked and interconnected network of polymer chains. The optical properties of the polymer were evaluated using ultraviolet-visible (UV-vis) spectroscopy, and the results indicated a strong absorption band in the visible region, characteristic of the naphthalene diimide moiety. The results of this study demonstrate the potential of PEEK-BPPNDI as a promising material for applications requiring high thermal stability, mechanical strength, and optical properties.

computation. In distributed optimization, this means algorithms can operate on aggregated data without revealing sensitive information about any individual data contributor.

Implementing differential privacy in distributed optimization

Incorporating differential privacy into distributed optimization algorithms involves several key strategies