Thesis Title	Mechanical Properties and Wear Resistance of Hexagonal
	Boron Nitride/Polyetheretherketone Composite
Thesis Credits	15
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Abstract

This research studied the effects of content and size of h-BN particles on mechanical properties and tribology properties, namely wear resistance and coefficient of friction. The contents of h-BN with 0, 5, 10, 15, 20 wt% and particle sizes of 0.1 and 1.5 μ m were mixed with PEEK and fabricated by compression molding process. Moreover, the effect of carbon nanotube particles that was incorporated with 20 wt% h-BN into polyetheretherketone matrix was investigated in terms of tribological properties.

The results showed that the increase in h-BN content enhanced the elastic modulus, flexural modulus and hardness of h-BN/PEEK composites. In contrast, the increase the h-BN content caused the decrease in tensile strength, flexural strength and elongation at break. The h-BN particle size of 1.5 μ m exhibited a significant improved tensile strength, flexural strength and elongation at break. From the sliding wear test at room temperature, almost wear rates of h-BN/PEEK composites increased as compared to neat PEEK. With the addition of h-BN from 10 to 20 wt%, the wear rates of h-BN/PEEK composites decreased. Under elevated temperature sliding wear test at 100, 200 and 300 °C, the wear rate increased with an increasing h-BN contents. The coefficient of friction reduced with increasing h-BN content in both room and elevated temperatures, especially the addition of h-BN content with 20 wt% could reduce coefficient of friction by 35 percentage as

compared to neat PEEK. In addition, the different h-BN particle sizes did not play an important role on tribology properties. According to the addition of CNT into 20 wt% h-BN/PEEK composites, the wear rate decreased 48 percentage. Enhancement of wear rate resulted from the increases of loads and sliding distances.

Keywords : Hexagonal boron nitride/Polyetheretherketone/Wear rate/Mechanical properties/Composite material/Compression molding