# NOVEL FLEXIBLE SHIELDING COMPOSITES CONTAINING NANO/MICRO BORON CARBIDE PARTICLES

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**Abstract** - High purity nano/micro boron carbide ($B_4C$) structures with various morphologies were synthesized using a modified sol gel technique in an attempt to control size, purity, crystallinity and phase content using different starting chemicals and processing conditions. The obtained $B_4C$ structures were first surface functionalized with different agents and then distributed within low density polyethylene. Polymer matrix composites plates containing different amount of boron carbide particles were manufactured using warm pressing. Shielding and mechanical properties of the final composite plates were reported in detail. Issues related with synthesis of pure boron carbide and obtaining composites plates containing homogeneously distributed boron carbide particles were discussed and effective solutions were also presented. Overall, it is shown that there is a close relationship between $B_4C$ loading and both shielding and mechanical properties of shaped composite plates. It is considered that the new combined technique described in the present work is cost effective as well as rapid way of obtaining new generation of low-weight shielding materials. It is also shown that as the amount of $B_4C$ is increased better shielding properties are achievable.

**Keywords** - Nano Boron Carbide, Sol-gel Synthesis, Polymer Composites, Shielding

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