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Layer-by-Layer Assembled Flame-Retardant Architecture toward High-Performance Carbon Fiber Composite

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ABSTRACT: Fire safety is a permanent challenge in carbon fiber (CF) epoxy resin (EP) composites, which largely restrict their application especially in high-performance fields with flame-retardant demands. Herein, an effective flame-retardant architecture consisting of branched polyethyleneimine (PEI) and ammonium polyphosphate (APP) was successfully fabricated on CFs surface through the facile layer-by-layer (LbL) assembly to achieve a bilayer polyelectrolytes coated CF (BL@CF), which did not only endow excellent flame retardance to the relevant composites (EP/(BL@CF)) with no additional flame retardants, but also maintained desirable mechanical properties. The as-prepared BL@CF were characterized by SEM-EDX, XPS and XRD, indicating that PEI/APP coating was successfully deposited on CFs surface with no damage to the structure of CF. The phosphorus-containing PEI/APP coating imparted high fire safety to the

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