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# Amino-terminated nitrogen-rich layer to improve the interlaminar shear strength between carbon fiber and a thermoplastic matrix

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## Abstract

An amino-terminated nitrogen-rich layer of poly(cyclotriphosphazene-co-melamine) (PPM) coating was used to functionalize carbon fiber (CF) to strengthen the interfacial adhesion of CF reinforced copoly(phthalazinone ether sulfone)s (PPBES) through a facile in-situ polymerization. FTIR, Raman and XPS confirm the chemical bonds between CF and PPM. SEM and dynamic contact angle tests demonstrate that PPM coating can enhance surface wettability, roughness of CF, which can improve interlaminar shear strength and flexural strength of CF/PPBES by 23.2% and 29.3% with no discernable decrease on tensile strength of CFs. According to DMA test, storage modulus and service temperature increase by 15 GPa and 6 °C. SEM observations certify that the failure mechanism transforms from interface failure for CF/PPBES to matrix failure and fiber broken for CF-PPM/PPBES. Moreover, the successful preparation of PPM coatings on CF surface

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