

Transparent Sensory Fiber-Reinforced Composites

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Transparent fiber-reinforced polymer composites are designed for high mechanical and sensory performance. In this study, it was aimed to elaborate optically transparent glass fiber-reinforced polymer composites as building components in futuristic architecture.

E-glass fabric was used as fiber reinforcement. The polymeric matrix, which was designed to have the same refractive index value with glass fibers, was synthesized from a calculated ratio of styrene and methyl methacrylate comonomers and was used as the polymeric matrix of optically transparent fiber-reinforced composites with strain sensing capabilities. The synthesized polymer was first melt-pressed into a film structure; then two sheets of these films and glass fabric were melt-pressed together in a sandwich manner.

Poly(ethylenedioxythiophene-poly(styrenesulfonic acid) (PEDOT:PSS) was used as conductive material. It was printed onto the finished composite, i.e. onto the surface of the polymer matrix. By matching the refractive index values of the thermoplastic matrix with those of the glass fabric and by using PEDOT:PSS, optically transparent polymer-based fiber-reinforced composite for sensory application were produced.