

Static and Dynamic Mechanical Behaviour of Carbon Fiber Reinforced Plastic (CFRP)

Single-Lap Shear Joints Joule-Bonded with Conductive Epoxy Nanocomposites

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Supporting Information

S1. Fabrication and surface modification of the CFRP laminates (adherends)

A quasi-isotropic CFRP laminate composed of six layers of plain weave carbon fiber cloth stuck by hand lay-up with a [0/90] fiber orientation was fabricated using the vacuum assisted resin infusion method and cured following the curing protocol described in Section 2.2. Once cured, the CFRPs were cut into 101.6 x 25.4 x 1.4 mm bars, as per the standard ASTM D1002 requirements for single lap shear test, using a Computer Numerical Control diamond saw, to be used as the adherends. In order to remove the epoxy and expose the underlying carbon fibers prior to being adhesively bonded, the bonding areas (12.7 x 25.4 mm) were grinded with 240-grit silicon carbide sandpaper, washed with acetone and water and dried in an oven at 100 °C overnight.

S2. Schematic of the failure mechanisms in adhesively bonded joints

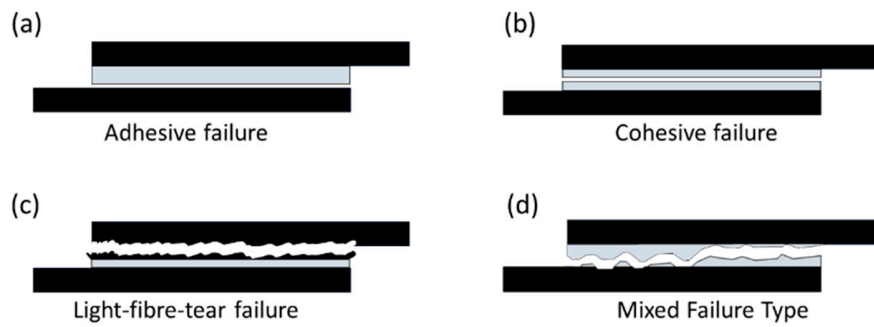


Figure S1. Schematic of the typical failure mechanisms occurring in adhesively bonded joints: (a) adhesive failure, (b) cohesive failure, (c) light-fibre-tear failure and (d) a mixed failure type.

S3. Fracture surface of the lap shear joints after the fatigue tests

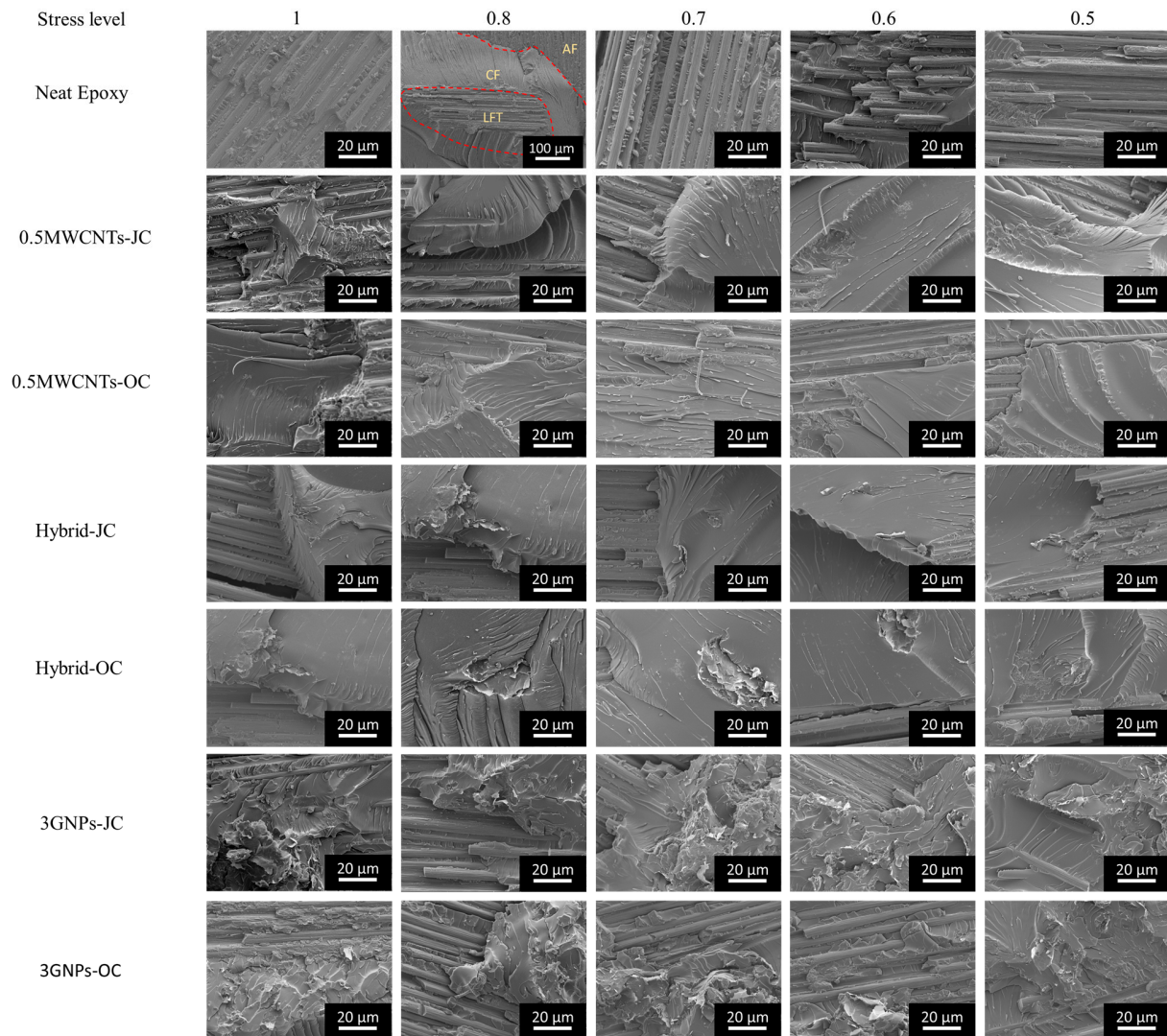


Figure S2. SEM images of the fracture surface of the lap shear joints bonded by different types of adhesives after fatigue test with the stress level of 0.9, 0.7, 0.6, and 0.5.