

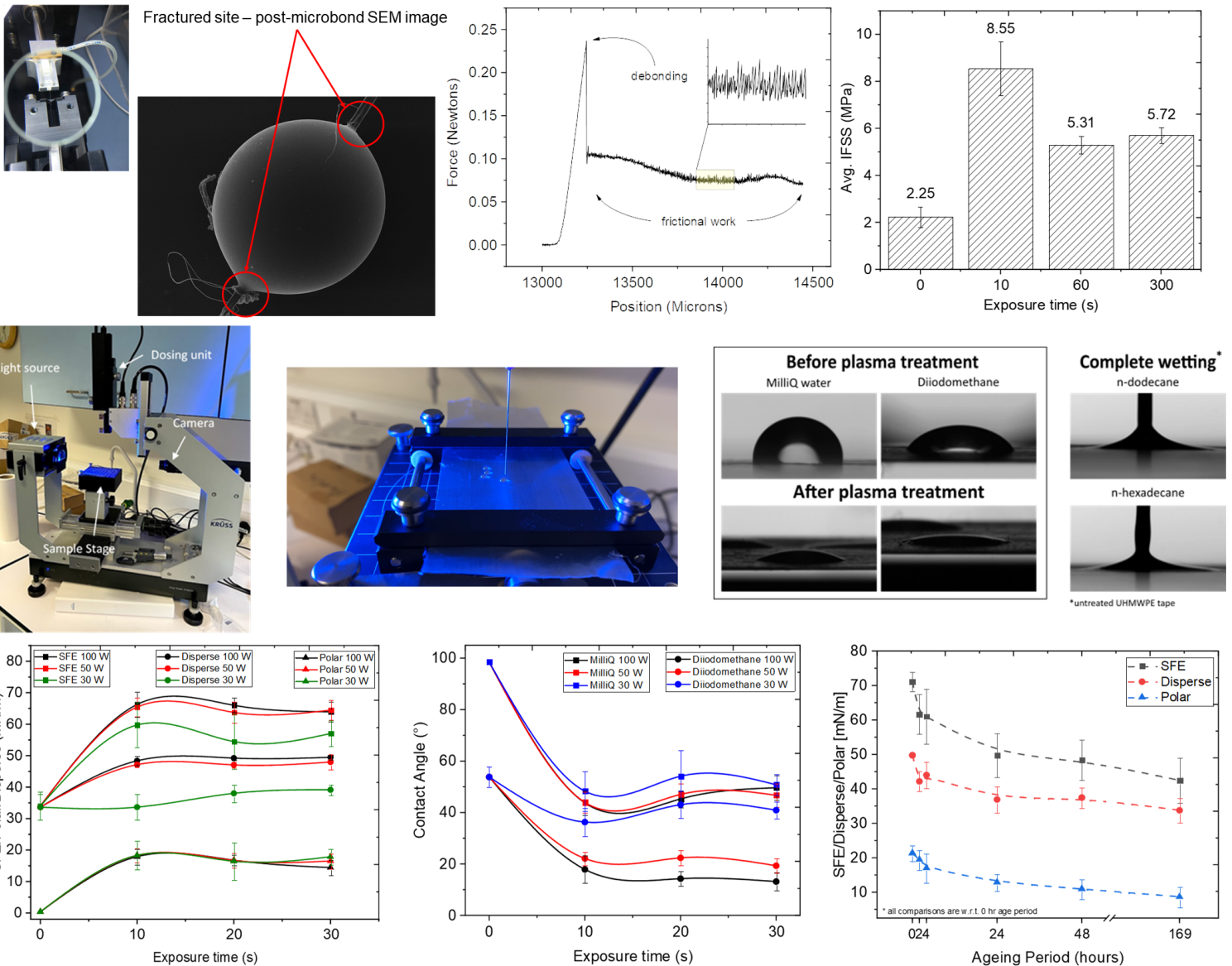
Effects of plasma treatment on adhesion and wettability of UHMWPE fibres/tape with epoxy resin

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Ultrahigh Molecular Weight Polyethylene (UHMWPE) fibres and tapes have a chemically inert surface and thus yield composites with low Interfacial Shear Strength (IFSS) and Interlaminar Shear Strength (ILSS). In this study, plasma treatment was conducted on these fibres and tapes to understand its effects on IFSS, surface free energy (γ_{SV} , γ_{SV}^P , and γ_{SV}^D) and contact angle. Finally, the effectiveness of plasma treatment over time was studied to determine the longevity of chemical changes on the surface.



Conclusions:

1. Plasma treatment increases the IFSS between UHMWPE and epoxy resin
2. The surface free energy (γ_{SV}), its polar (γ_{SV}^P) and dispersive (γ_{SV}^D) components increase as a result of plasma treatment
3. The Water Contact Angle (WCA) decreases drastically after plasma treatment
4. A drop of $\approx 40\%$ in polarity is observed within first 24 hours of treatment