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## CENTRE FOR ADVANCED PHOTONICS & PROCESS ANALYSIS CAPPA

Innovation Through Light

## **Scanning Electron Microscopy**

## **Capability Case Study**

CAPPA operates a variable pressure scanning electron microscope (SEM) [Hitachi S-37000N VP-SEM] equipped with energy-dispersive X-ray spectroscopy (EDS) [Oxford Instruments X-MaxN 80 T]. The microscope allows magnification up to x300,000 with a resoluDon of 3-4nm. The large chamber can accommodate samples up to 300mm in diameter and 110mm in height, and the variable pressure mode allows viewing samples in their natural or wet state, without the need for metal coating.



SEM image of daisy pollen (x1000 magnificaDon)



SEM image of communications cable showing degradation



2D SEM image of groove in a metal plate



SEM image of a fly



Element identification from same communication cable



3D SEM image of same groove in a metal plate



Higher magnification image of fly's eye



Image of contaminant particle



SEM image of damage in a wire



SEM image of a crab shell



Element identification from same contaminant particle



SEM image of fibre optic cable

Energy Dispersive X-Ray Spectroscopy (EDS) The EDS system works in tandem with the SEM to provide further characterisation of the elemental composition of samples. The analysis below was performed on a 1% (w/w) MgSt in MCC blend.



Carbon distribution



Oxygen distribution



Magnesium distribution



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