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The effect of ordering of conductive polymer (pEDOT) on the conductivity in composites and the stage of manufacturing at which ordering occurs

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Some conducting polymer composites have shown counterintuitive increases in conductivity with increased quantities of incorporated non-conducting polymer (NCP). For example the conductivity of pEDOT, as a function of volume fraction of NCP, paradoxically increases for up to 70% volume fraction of PEG, however this is distinct to what is being observed for pEDOT:gelatin composites which follows percolation theory in its conductivity trend. GIWAXS measurements were made on the SAXS/WAXS beamline at the Australian Synchrotron to investigate the effects of adding varying quantities of NCP on the packing of the conducting polymer in the composite thin films. In-situ GIWAXS was used to explore the stages of pEDOT composite film manufacture at which ordering occurs.

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