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## **Strain-related carbon ordering on a sub-mm scale: a comparison of carbonate microfabrics and organic carbon nanostructure within a single sample.**

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Organic carbon in rocks undergoes nanostructural changes when exposed to increased temperatures or strain. These changes can be identified using Raman spectroscopy, giving information about thermal maturity and strain conditions. However, it is well documented that in a heterogeneous rock, strain can be highly localised, evident in microstructural variations such as strain shadows, sub-grain development, twinning, and the rotation and alignment of crystal axes. In this study we map microstructural textures in deformed calcite through optical microscopy and EBSD of calcite crystal axes. This textural map is compared to mapped Raman spectral parameters of organic carbon particles in the same thin section. A comparison of the maps allows assessment of the extent to which Raman spectral parameters and hence carbon nanostructure is influenced by strain at a sub-mm scale. The study highlights the sensitivity of organic carbon nanostructure to sub-mm scale changes in strain localisation within a single deformed carbonate sample.