

P81

IR AND RAMAN MICROSCOPY FOR THE CHARACTERIZATION OF ANCIENT LIFE

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Spectroscopic analyses by using IR and laser Raman microspectroscopy have been conducted on microfossils in order to find molecular traces of ancient life. Microfossils in ~850 Million year ago (Ma) old black chert collected from the Bitter Springs Formation, Central Australia, are well preserved, are morphologically diverse, and have inner structures that resemble cell walls and/or membranes. Micro-Raman spectroscopy on carbonaceous brown to amber portions of microfossils showed disordered peak (D peak, 1340 cm⁻¹) and ordered peak (O peak, 1600 cm⁻¹) of graphite, indicating their kerogen-like structure. IR micro-mapping results revealed that the distributions of peak heights at 2920 cm⁻¹ (aliphatic CH₂) and around 1365 cm⁻¹ (possibly C-N) are quite similar to those of microfossils. These results indicate that IR and Raman microspectroscopy can be used for characterization of ancient microfossils.