# Experimental study on durability of organic components in cyanobacteria during diagenesis

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To study the durability of organic components in microfossils during diagenesis, in situ heating IR measurement of cyanobacteria Synechocystis sp. PCC6803 was conducted. The cyanobacteria samples embedded with and without amorphous silica were heated at 200-500 C under both atmospheric and low-oxygen conditions. The absorbance of aliphatic $CH_2$, N-H, C=O (amide I) and C-N-H (amide II) decreased with time, indicating degradations of those functional groups. The aliphatic $CH_2$ was found to be the most durable functional group under both the low-oxygen and atmospheric conditions. This is consistent with the analysis of Proterozoic microfossils in Bitter Spring Formation (~850 Ma) that the predominant IR signature is aliphatic $CH_2$. The degradation rates of aliphatic $CH_2$ under the low-oxygen condition were several orders of magnitude slower than those under the atmospheric condition, and the embedding with amorphous silica decreased the degradation rate. Extrapolation of the results to the temperatures of diagenesis shows that the aliphatic $CH_2$ can be preserved in microfossils more than ~$10^2$-$10^7$ yr at 0-100 C.