**Surface Enhanced Confocal Raman Microscopy of Electroactive Biofilms**

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Electroactive bacteria can donate their metabolic electrons to an insoluble terminal electron acceptor, such as metal oxides and positively poised electrodes, in the latter case creating electrical current. The electroactive biofilms that they form are important both for nutrient cycling in nature and for microbial electrochemical technologies, such as microbial fuel cells and microbial electrosynthesis cells, which use electroactive bacteria as catalists for power or added-value chemical production.1,2 While our understanding of electroactive biofilms has improved in recent years, much still remains to be elucidated. Confocal Raman Microscopy is a non-destructive method that enables 3D imaging with sub-optical lateral resolution, where each pixel contains a Raman spectrum at a well-defined vertical position. This way, the chemical composition and even redox states in the sample can be mapped, as shown before for cytochromes in an electroactive biofilms3. Since the method is non-invasive, the undisturbed sample can be followed in time, revealing the chemical changes undergone by the biofilm as it develops. Here we report a new method for surface enhanced confocal Raman microscopy of electroactive biofilms, and present the time development of the biofilm chemical composition.

References:

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