



Non-invasive technique to measure biogeochemical parameters (pH and O₂) in a microenvironment: Design and applications

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The primary objectives of this research are to do the pH and O₂ sensor foils calibration and then to test them in applications. Potentially, this project can be utilized to monitor the fate and transport of radionuclides in porous media. The information for physical and chemical parameters (e.g. pH and O₂) is crucial to know when determining contaminants' behavior and transport in the environment. As a non-invasive method, optical imaging technique using a DSLR camera could capture data on the foil when it fluoresces, and gives a high temporal and spatial resolution during the experimental period. The calibration procedures were done in cuvettes in a row. The preliminary experiments could measure pH value in the range from 4.5 to 7.5, and O₂ concentration from 0 mg/L to 20.74 mg/L. Applications of sensor foils have involved nano zero valent and acid rain experiments in order to obtain a gradient of parameter changes.