Abstract for the 7: YUCOMAT 2007, the 9th annual conference of the Yugoslav Materials Society, Herceg Novi, Montenegro. Sept. 10-14, 2007, http://www.yu-mrs.org.yu/

NANOBIOLOGICAL ATOMIC FORCE MICROSCOPY STUDY OF THE SPORULATION OF *BACILLUS SUBTILIS*

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Atomic force microscopy can yield valuable information concerning changes in material properties of living organisms. *Bacillus subtilis* is a single celled bacterium commonly found in soil. It can sporulate, i.e. reversibly form a tough and protective endospore that allows the organism to tolerate extreme environmental conditions. *B. subtilis* is not harmful to human health and its robust spores may therefore serve as safe model organisms for pathogenic microorganisms in drinking water. Thus, this organism is used to evaluate water disinfection devices that utilize UV radiation.

By inducing adverse environmental conditions to living *B. subtilis* cells while imaging them with the atomic force microscope, the sporulation procedure was successfully recorded over a time span of about 50 hours. Given this promising result, the recording time of material properties shall be extended to a week, thereby covering the entire sporulation procedure from the vegetative cell to the spore. Two methods of spores production resulting in different types of spores were included in the investigation. One type of *B. subtilis* spores is highly resistant to UV irradiation, whereas the other type shows a low UV resistance By means of the atomic force microscopy technique differences in the characteristics of the different spores may be elucidated. Detailed scientific understanding of the sporulation of this organism shall provide information regarding the development of novel biomimetic UV resistant materials.