Supporting Information

A new approach for pyrene bioremediation using bacteria immobilized in layer-by-layer assembly microcapsules: Dynamics of soil bacterial community

Fucai Deng\textsuperscript{a}, Changjun Liao\textsuperscript{a,b}, Chen Yang\textsuperscript{a,c*}, Chuling Guo\textsuperscript{a,c}, Lin Ma\textsuperscript{a}, Zhi Dang\textsuperscript{a,c*}

\textsuperscript{a} College of Environment and Energy, South China University of Technology, Guangzhou, 510006, China
\textsuperscript{b} Department of Environmental Engineering, Guangdong Vocational College of Environmental Protection Engineering, Foshan, 528216, China
\textsuperscript{c} The Key Laboratory of Pollution Control and Ecosystem Restoration in Industry Clusters, Ministry of Education, China

\textsuperscript{*}Correspondence: Dr. Chen Yang & Dr. Zhi Dang, College of Environment and Energy, South China University of Technology, Guangzhou, China; Phone: (+86)-020-87110198, E-mail: cyanggz@scut.edu.cn & chzdang@scut.edu.cn
Standard protocol of biological slices preparation for TEM analysis

The TEM specimens of *P. putida* cells were prepared by the following procedures. The native and treated cells were quickly fixed in the mixture solution (4% of paraformaldehyde and 2.5% of glutaraldehyde) for 12 h at 4 °C. Followed by washing three times, the samples were postfixed with 1% osmium tetroxide in 0.05M sodium cacodylate buffer for 2 h. After fixation, the samples were concentrated by centrifugation at 6000 rpm for 2 min and washed twice with PBS buffer. The concentrated cells were dehydrated with sequential treatment with 30, 50, 70, 80, 90, and 100% ethanol for 10 min. The cells were then infiltrated and embedded in Spurr’s resin with propylene oxide (treatment with 3:1, 2:1, 1:1, 1:2, and 1:3 of propylene oxide/Spurr’s resin mixtures for 30min each, and 100% Spurr’s resin for 25 h). The samples, filled with Spurr’s resin, were cured overnight at 70 °C to form sample blocks. The polymerized blocks were sectioned using an ultramicrotome (MT-X, RMC), and the thin sections were stained in 2% uranyl acetate and lead citrate, and examined by TEM at 100 kV accelerating potential.

Figure S1
Figure S1 N$_2$ adsorption - desorption isotherms of the CaCO$_3$ template (a), LBL microcapsule with (b), and without (c) CaCO$_3$ template.