

Microbial production of single- and multi-element nanomaterials

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Here we report biosynthesis of 60 different nanomaterials by employing a recombinant *Escherichia coli* strain co-expressing metallothionein and phytochelatin synthase. The periodic table was scanned to select 35 suitable elements, followed by biosynthesis of their nanomaterials. Based on the Pourbaix diagram analyses, the initial pH of reactions was changed from 6.5 to 7.5, resulting in biosynthesis of crystalline nanomaterials of those previously amorphous or not synthesized ones. The strategy described in this study allows biosynthesis of inorganic nanomaterials with various properties, providing a new platform for manufacturing diverse nanomaterials in environmentally friendly manner. [This work was supported by the Technology Development Program to Solve Climate Changes on Systems Metabolic Engineering for Biorefineries from the Ministry of Science and ICT through the National Research Foundation (NRF) of Korea (NRF-2012M1A2A2026556 and NRF-2012M1A2A2026557).] (Reference: Choi, Y., Park, T.J., Lee, D.C., and Lee, S.Y. (2018) Recombinant *Escherichia coli* as a biofactory for various single- and multi-element nanomaterials, Proc. Nat. Acad. Sci. (PNAS), 115(23): 5944-5949.)