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(54) Title: USING SYNTHETIC LIXIVANT BIOLOGY FOR THE RECOVERY OF PRECIOUS AND TOXIC METALS FROM ANTHROPOGENIC SOURCES

(57) Abstract: The present invention generally relates to methods of biological reduction of metal-cyanide complexes after metal-cyanidation and methods of biologically hydrolysing cyanide. More particularly, the present invention allows the engineering of an integrated synthetic lixiviant biological system to be housed within a synthetic host (such as the cyanogenic *Chromobacterium violaceum*) for efficient precious metal recovery and toxic metal remediation of electronic waste; with up to four main components/modules in the design and engineering of the synthetic host: 1) synthetic cyanogenesis; 2) synthetic metal recovery; 3) synthetic cyanolysis; and 4) synthetic circuits for lixiviant biology.

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