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(54) Title: MODULAR BIOHYBRID SYSTEMS AND METHODS OF USE THEREOF

(57) Abstract: Modular bio hybrid systems, some of which suitable for photochemical biosynthesis, are described. These systems are characterized by functionalized photocatalytic nanoparticles that are independently prepared, then assembled and attached to the modified surface of a cell, thereby enabling the cell to absorb light energy and convert it into chemical energy, for example in the form of a redox cofactor. The generated chemical energy then serves as fuel for production pathways of metabolites useful for the manufacturing of fuels, nutraceuticals, pharmaceuticals and cosmetics.