

Self-Assembled Modified Beta Solenoid Protein Scaffolds for Devices and Materials

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ABSTRACT

Available for licensing are patent rights in novel and versatile beta solenoid proteins that are useful as scaffolds for nanoparticle assembly, photocatalytic devices, thermoelectric devices, passive absorption of small atoms or molecules, cement additive, heavy element remediation, heavy element absorption, and as biological catalysts.

FULL DESCRIPTION

Currently, nanoparticle assembly is a difficult and error-prone process. Due to the scale, small interactions can inhibit proper assembly and decrease the efficiency of production. Externally directed assembly of nanoparticles provides greater accuracy, improved control, and a greater number of useful embodiments.

Researchers at the University of California have engineered novel proteins capable of generating 1, 2, and 3 dimensional scaffolds useful in the production of nanoscale materials and devices. These proteins can be manufactured using standard techniques, and proteins can be engineered to have 1-4 sides of varying length. By modifying the external side chains of the proteins, one can direct specific lateral self-assembly of the proteins or nanoparticles. Due to the high degree of control one has over the structure of the proteins, one can manufacture myriad nanoscale materials efficiently and with a high degree of accuracy. Because these novel proteins are so versatile, the potential research and industrial uses are vast.

APPLICATIONS

- ▶ Scaffold to direct nanoparticle self-assembly, especially nanoscale wires
- ▶ Scaffold to direct nanorod assembly for production of photovoltaic devices
- ▶ Scaffold to direct assembly of nanoscale thermoelectric devices
- ▶ Scaffold to direct assembly of nanoscale catalytic devices
- ▶ As a gettering device for sequestering heavy metal ions from the environment
 - ▶ Potential use for extracting nuclear fuels from seawater
- ▶ Scaffold to direct assembly of calcium carbonate for crack repair in cement formations
- ▶ As an biological catalyst inside microbes to control catalytic activity of native enzymes

FEATURES/BENEFITS

- ▶ Can be manufactured cheaply using standard techniques
- ▶ The length of the assembly can be tailored to a specific need
- ▶ Capable of scaffolding with any flat surface, and serve as a template for 1, 2, or 3 dimensional nanoscale assemblies
- ▶ Highly versatile and useful in many different industries

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,287,332	05/14/2019	2014-089

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OTHER INFORMATION

KEYWORDS

nanoparticle, protein
 scaffolds

CATEGORIZED AS

- ▶ **Biotechnology**
 - ▶ Proteomics
- ▶ **Materials & Chemicals**
 - ▶ Biological
 - ▶ Chemicals
 - ▶ Nanomaterials
- ▶ **Nanotechnology**
 - ▶ Materials
 - ▶ NanoBio
- ▶ **Research Tools**
 - ▶ Other

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