

## Petro Chemistry: 2016 Nano-bio-mining using bacteria to produce nano-minerals- Reza Javaherdashti-Australia

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In this work, we propose to apply TRIZ approach towards utilization of magnetotactic microorganisms for the extraction of the magnetosomes normally delivered by these microscopic organisms. All the more explicitly, we recommend to apply the second standard of TRIZ (BioTRIZ) to the particular instance of Magnetotactic microbes: we are speculating that it could be conceivable to support these microscopic organisms with specific measures of iron-containing supplements to concoct magnetosomes of changing, alluring nano sizes. At that point the microbes can be murdered and the naturally framed nano-magnets created by them can be "taken out". These nano-size magnets would then be able to be utilized in different applications, maybe nanogenerators or the like nano-gadgets. The thought communicated here has the accompanying oddities: 1. Use of (Bio) TRIZ standards to bio-nanotechnology. 2. Presentation of the new idea of "Nano-bio-mining" where living smaller scale life forms might be modified to make Nano-size metallic aggravates that, at that point, can be expelled and applied in different applications. In current occasions, at any rate since 1950's, inquire about has been adopted as a precise strategy that can be characterized as far as scarcely any standards. Nowadays, critical thinking and development is impossible by peculiar looking researchers who are frequently being generalized. Or maybe, development has its own tool kit and calculation.

An amazing asset of innovation is TRIZ. TRIZ is the condensing of the Russian expression "□□□□□□ □□□□□□ □□□□□□□□□□□□□□□□ □□□□□" that can be deciphered as "The hypothesis of imaginative critical thinking". TRIZ has intriguing highlights among which are its 40 standards. The fundamental highlights of TRIZ and how they are relevant have been tended to in the work by Levbare et al. In light of their work, we can sum up these highlights in The second guideline of TRIZ is "Taking out". This rule can be expressed as "Discrete a meddling part or property from an article, or single out the main essential part (or property) of an item" (<http://www.1000advices.com>). In this paper, we will apply this second standard of TRIZ into an organic framework (Magnetotactic Bacteria) to recommend another way for nano biotechnological look into patterns. Among different kinds of small scale living beings that can be found in nature, there is a class of microorganisms that can be on the whole alluded to as "magneto strategy microbes" or – equivalently magnetic microscopic organisms. These microorganisms are named attractive in such a case that their capacity to shape nano size magnets inside their "body". The normal size of each of these nano size magnets (called a magnetosome) is around 50 nm. Attractive microscopic organisms were found in mid 1970s and they can either be oxygen consuming or anaerobic. These microorganisms may likewise be helpful in taking out metals and – possibly going about as "soil purifiers" for the tainted soils. As attractive microscopic

organisms is fit for collecting gigantic measures of iron. It has been guessed they might be an instrumental factor in inciting erosion. As indicated by Hughes while up to 80% of magnetosome comprises of magnetite (Fe<sub>3</sub>O<sub>4</sub>), it can exceptionally be conceivable that different minerals of iron – for instance iron sulfides-may likewise exist in some attractive microscopic organisms. shows the conceivable system by which Fe<sub>3</sub>O<sub>4</sub> can be framed inside magnetosomes. It follows then that magnetotactic microorganisms are fit for being imagined as small normal assembling plants in which gave that their necessary measurements of iron is provided, nano size magnets (magnetosomes) can be relied upon to frame. This is a significant part of our proposition in two regards: It is the magnetosomes that will be the focal point of the second TRIZ guideline in our hypothesis. It is these magnetosomes-as nano magnets - that will be the essential "items": of utilizing attractive microscopic organisms. Nano-magnets have different fields of use for instance in Medicine or even in information stockpiling. In this manner, nano-magnets are, as time passes by will become, significant in not just multilateral administrations they can furnish us with yet in addition cutting back the gadget's sizes just as being as per TRIZ sixth Principle (Universality) and 28th Principle (Mechanics Substitution. Like all other field of science and innovation, biotechnology and exceptionally nano-biotechnology have an incredible potential for applying TRIZ standards as a calculation for creations. In this work, we have recommended that the second standard of TRIZ (the rule of "taking out") can be applied to natural frameworks. The model here was magnetotactic microscopic organisms. Magnetotactic microscopic organisms structure nano-size magnets (iron oxide) - that are called magnetosome - which they normally produce by taking in iron. It was recommended that normally happening magnetosomes can be become inside the microscopic organisms and-perhaps with controlling boundaries, for example, iron take-up various sizes of these magnets can be created inside microorganisms. At that point these magnets can be "taken out" and be utilized in applications, for example, yet not constrained to, nano-magnets. Possibly, this proposition can likewise incorporate development of other nano-size "minerals, for example, iron oxide. We call the entire procedure of developing such minerals inside the microscopic organisms and afterward extraction of them as "Nanobio-mining" as the size of the mineral is in the scope of nano particles, the source where the mineral is framed in natural, that is the microorganisms, and the activity of separating and taking out these minerals looks like mining as in metals are removed and removed from their minerals. The thought communicated here has the accompanying curiosities: Utilization of (Bio) TRIZ standards to bio-nanotechnology. Presentation of the new idea of "nano-bio-mining" where living miniaturized scale life forms might be customized to fabricate Nano-size metallic intensifies that, at that point, can be expelled and applied

in different applications. In this work, we propose to apply TRIZ approach towards use of magnetotactic bacteria for the extraction of the magnetosomes naturally produced by these bacteria. More specifically, we suggest to apply the 2nd principle of TRIZ (BioTRIZ) to the specific case of Magnetotactic bacteria: we are theorizing that it could be possible to nurture these bacteria with certain amounts of iron-containing nutrients to come up with magnetosomes of varying, desirable nano sizes. Then the bacteria can be killed and the biologically- formed nano-magnets produced by them can be

“taken out”. These nano-size magnets can then be used in various applications, perhaps nanogenerators or the like nano-devices. The idea expressed here has the following novelties: 1. Application of (Bio) TRIZ principles to bio-nanotechnology. 2. Introduction of the new concept of “Nano-bio-mining” where living micro-organisms may be programmed to manufacture Nano-size metallic compounds that, then, can be removed and applied in various applications.

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