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LIGHT-POWERED MICROMOTOR: SYNTHESIS, MOTION BEHAVIOUR AND APPLICATIONS

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Abstract:

Photocatalytic micromotors or light powered micromotors have been studied intensively for the past few years for several applications such as environmental remediation, biomedicine and micropumps. In water remediation, conventional wastewater treatment has been known for its economically infeasible. Therefore, a different approach by using micromotor as the possible substitute for water remediation has been focused on. Throughout the years, a substantial number of researches has been done in the synthesis of these light-powered micromotors which revolves around its materials used, motion behavior and its applications. Hence, this paper focus on the progress of light-powered micromotors which will focus on the synthesis method, motion behavior and its applications.

Keywords:

Light powered, micromotor, synthesis, motion behavior, application

Objectives:

- To highlight the progress of developing light-powered micromotor
- To discuss the synthesis methods, motion behavior and applications

Result and Conclusion:

Light powered micromotor have shown a lot of great potential in the application related to environmental remediation, biomedicine, and cargo transportation. The flexibility of materials combination allows the micromotors to have a different function according to each characterization. In past several years, light powered micromotors depending on high concentration and toxic fuels. Photocatalytic materials such as silica dioxide (SiO₂) and titanium dioxide (TiO₂) have been the main focus in fabricating light powered micromotors. The focus then turns towards a more efficient light driven micromotor with a lower energy band gap such as bismuth oxyiodide (BiOI). The use of polymer based micromotor also have been becoming an interest among researchers as it provides less threats to the environment.

In term of synthesis aspect, all the synthesis methods were in small scale production as to the best of knowledge. In moving towards macro scale production, a more substantial progress should be made in the aspects such as interaction between the particles and interaction between the surrounding environment and micromotor itself. Even though there are promising novel light powered micromotor up to these dates, a combination of different actuation sources effect on micromotor is still at scarce. In real environment, the actuation sources can be found almost everywhere in which it might affects the motion behavior of the light powered micromotor. Hence, a combination study of all the actuation sources towards a group of micromotors should be studied to observe the behavior.

All in all, the light powered micromotor field is still in early stage of development. Without a doubt, light powered micromotor is one of the most exciting research in nanomaterials advancement with their flexibility in implementation of various kind of alteration. Therefore, it is expected to grow at a faster pace in few years to come especially in moving towards macro scale production which might open a plenty more door to explore.