浮遊性基材に担持させた TiO_2 光触媒の作製と水浄化評価

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Preparation of TiO_2 photocatalyst supported on floating substrate and evaluation of water purification ([1]*Faculty of Engineering*, [1]*Tokyo University of Science*) ○Riku Kanezawa[1], Morio Nagata[1]

Photocatalyst can decompose organic matter in water through a redox reaction under light irradiation, and are expected to be a functional material as a countermeasure against water pollution, which has become increasingly serious in recent years. However, powder photocatalyst are difficult to separate from solution. In this study, we fabricated a floating photocatalyst by supporting photocatalyst on a material with small density, and succeeded in making it float in water. Since the floating photocatalyst floats in water, there is no need for filtration when collecting it, and it can be collected by scooping it with a net. The performance of levitated photocatalyst was compared by using multiple (perlite, hollow ceramic beads, acrylic balls) levitated substrates to fabricate levitated photocatalyst by sol-gel and dip-coating methods. Evaluation of water purification by photoirradiation degradation of 70 μM methylene blue (hereafter MB) solution (left figure below) showed that after 4 hours of UV irradiation (>360 nm), the suspended photocatalyst was able to degrade MB in solution (right figure below). The best performance was achieved with TiO_2/hollow ceramic beads, which could decompose about 80% of MB in solution.

光触媒は、水中の有機物を光照射での酸化還元反応で分解でき、近年深刻化している水質汚染の対策として期待される機能性材料である。しかしながら、粉体光触媒では溶液との分離が困難である。本研究では、密度が小さい物質に光触媒を担持させることで、浮遊性光触媒を作製し、水に浮くことに成功した。浮遊性光触媒は水に浮いているため、回収の際にろ過の必要が無く、網などですくうことで回収できる。複数（パーライト、中空セラミックビーズ、アクリルボール）の浮遊性基材を用いて、ゾル-ゲル法とディップコート法で浮遊性光触媒を作製することで、浮遊性光触媒の性能の比較をした。

70 μM メチレンブルー（以下 MB）溶液の光照射分解（下左図）による水浄化評価を行ったところ、4 時間の UV 照射（360 nm 以上）で、浮遊性光触媒は溶液中の MB を分解することができた（下右図）。一番性能が良かったのは TiO_2/中空セラミックビーズで、溶液中の MB を約 80%分解できた。