## SYNTHESIS AND STUDY OF $TIO_2$/ACTIVATED CARBON COMPOSITES

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In article [1], a comparison of photocatalytic activity of crude $TiO_2$ and $TiO_2$ immobilized on activated carbon particles are presented. These samples were analyzed for the degradation of pharmaceuticals: paracetamol, amoxicillin, diclofenac, and ampicillin. The oxidation of drugs took place with the help of solar radiation. The composite $TiO_2$ immobilized on the surface of carbon was obtained by temperature impregnation. $TiO_2$ particles have been successfully immobilized on activated carbon. This is shown by the results of the Brunauer-Emmett-Teller analysis, scanning electron microscope and Fourier transforms infrared spectroscopy. The $TiO_2$ composite is completely dissolved ampicillin and amoxicillin. Pure $TiO_2$ expanded these drugs by only 83 % and 89 % respectively. The composite has achieved a higher degree of removal of paracetamol (70 %) and diclofenac (85 %) than pure titanium oxide. It has been found that the composite $TiO_2$ has lower costs of full scale solar photocatalytic reactor.

In work [2], the cooling water from the refinery, which was selected during the year, was analyzed. Samples of water were treated with pure ultraviolet light and ultraviolet with the addition of titanium oxide. Water purification was carried out in a UV-reactor at a wavelength of 254 nm. The oxide particles were applied to the glass substrates and loaded into the reactor. Water samples were tested for total organic carbon, total bacteria count, chemical oxygen demand and biological oxygen demand. As a result of the research it was found that the pollution of cooling water varied considerably during the year. Photocatalysis is an effective way to disinfect water. The number of bacteria decreased by 22 % when UV-radiation was used for 30 seconds, by 62 % when UV-radiation was used with the addition of titanium oxide for 30 seconds. UV-radiation with $TiO_2$ is also effective in photo degradation and mineralization of organic molecules.

1. Gar Alalm, M., Tawfik, A., Ookawara, S. (2016). Enhancement of photocatalytic activity of $TiO_2$ by immobilization on activated carbon for degradation of pharmaceuticals. Journal of Environmental Chemical Engineering, 4(2), 1929-1937.

2. Haolat, J. O., George, A., Issa Suleiman, M., Berthod, M., Wang, K. (2018). UV-$TiO_2$ treatment of the cooling water of an oil refinery. Journal of Water Process Engineering, 26, 176-181.