

**REMOVAL OF Cr AND Zn USING AgNP_s / TiO₂
NANOCATALYST**

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AUTHOR'S DECLARATION

I declare that the work in the thesis was carried out in accordance with the regulation of Universiti Teknologi MARA. It is original and is the results of my own, unless otherwise indicated or acknowledge as reference work.

I, hereby acknowledge that I have been supplied with the Academic Rules and Regulations, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Presently, water pollution is increasing by years. Water pollution is occur when there is pollutant or foreign substance contain in the water that decrease the quality of water and become toxic to living organism. One of the major causes that lead to water pollution are heavy metals. Heavy metals is the toxic substance even though at low concentration that can cause adverse effect. The objective of this research are to synthesis of titanium dioxide nanotubes (TNT_s) decorated with silver nanoparticles (AgNP_s) and to evaluate the removal of zinc and chromium ions by using the TNT_s / AgNP_s catalyst with different contact time and initial concentration of Cr and Zn ions. In this research, the TNT_s were prepared by using anodisation process at constant 60 V for 20 minutes and by using EG / NH₄F / K₂CO₃ as electrolyte. Besides, the AgNP_s were prepared by using salt reduction method with AgNO₃, *K. brevifolia* extract and NaOH. Next, the TNT_s / AgNP_s were prepared by using wet impregnation method. Lastly, the removal of chromium and zinc ions were remove by putting the TNT_s / AgNP_s into each different concentrations which are 5 ppm and 10 ppm. Furthermore, the characterization of the, TNT_s, AgNP_s and TNT_s / AgNP_s were done by using Field Emission Scanning Electron Microscopy (FESEM), and Energy Dispersive X-ray Analysis (EDX) and for zinc and chromium ion removal were analysing it by using Inductively Coupled Plasma – Optical Emission Spectrometry (ICP-OES). From the result obtained, TNT_s / AgNP_s has high efficiency for the removal of Zn ions since the percentage removal of 5 ppm and 10 ppm were 90.81% and 37.16% for Zn ions while percentage removal of 5 ppm for Cr ions was 9.53% respectively. Apart from that, the performance of Zn ions removal by using TNT_s / AgNP_s are better compared to Cr ions removal under visible light condition.