

## APPLICATION OF TUNGSTEN OXIDE ( $WO_3$ ) CATALYSTS LOADED WITH Ru AND Pt METALS TO REMOVE MTBE FROM CONTAMINATED WATER: A CASE OF LABORATORY-BASED STUDY

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**Received: 01 Jul 2018**

**Accepted: 01 Aug 2018**

**Published: 18 Aug 2018**

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### **ABSTRACT**

*The World Health Organization has raised concerns about the accidental fuel leakage during storage and transportation and, therefore extensive methyl tertiary butyl ether (MTBE) use has led to cases of natural water contamination [1-9]. This article describes the (i) visible light reaction condition for MTBE, (ii) solid-phase micro extraction (SPME) technique incorporated with gas chromatography mass spectrometry (GC-MS) to assist the MTBE photo oxidation process, (iii) catalyst syntheses from different concentration of Ru in tungsten oxide ( $WO_3$ ), nano- $WO_3$ , Pt in nano- $WO_3$ , and (iv) formation of by-products during photocatalytic degradation of MTBE by using the GC-MS [10-17]. The experimental results indicated that the MTBE removal can quickly and accurately be achieved in presence of Pt-loaded nanostructured  $WO_3$  under visible light radiation, i.e., 96-99% removal between 2.5 hours and 3 hours. The Pt/ $WO_3$  nano-composite showed much better photocatalytic MTBE removal than those of the Ru/ $WO_3$  and pure nanostructured and micron-sized  $WO_3$  [10]. Additionally, the by-products formation during photocatalytic degradation of MTBE obtained from GC-MS revealed that the degradation of MTBE proceeds essentially via formation of formic acid and 1, 1-dimethylethyl ester before its complete degradation [10].*

**KEYWORDS:** MTBE, nano- $WO_3$ , Ru/ $WO_3$ , Pt/ $WO_3$  nano-composite, XRD, GC-MS, UV