DEDICATION

To my Husband

To my Family
Acknowledgement

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Yasmeen Hafiz
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Abstract

In this research study, a simple and active photo-catalysis system was assembling. It consists of a UV monochromatic light
source, quartz cell (which is transparent to UV) to hold the sample and magnetic stirrer. The functions of the light source are: (i) to achieve photo activation of the chemical reactions (ii) to obtain certain chemical yields (iii) removing toxic phenol out of water. The later was achieved by adding a semiconductor material to stimulate the chemical reactions of materials as they interact with the applied light, simulation of the state existence the phenol in wastewater. The semiconductors were Iron Oxide and Zinc Oxide with different weights. In this work laser light producing 532 nm with BBO non-linear crystal producing UV laser with 266nm, and a LED of $\lambda = 375$ nm were used. Absorption spectra of samples were recorded before and after irradiation. The influence of the interacted material weights, diameter of the monochromatic light, exposure time were studied. The later parameters were investigated to optimize conditions needed to completely remove phenol. It is shown from this study that phenol removal is increased when increasing weight of the stimulating material (semiconductor), exposure time, and light beam diameter. It is shown that the best result was attained at 30 minutes exposure time, 600 mg of the $\text{Fe}_2\text{O}_3$ and 2.3 cm diameter of light. The samples which were exposed to laser irradiation showed less efficiency as compared to those exposed to light emitted diode irradiation. This is due to the higher power of LED (1watt) as compared to the 6mW of the laser power.

المستخلاص
في هذا البحث تم تجميع منظومه بسيطة وفعاله تتكون من مصدر ضوئي احادى الطول الموجي في المنطقه الفوق البنفسجيه من
الطيف وخلية كوارتز لامعًا وشاعرًا فوق بنفسه وحرك مغناطيسي لأحداث تنشيط ضوئي للتفاعلات الكيميائية، وتوجه سير التفاعل الكيميائي ضوئيًا للحصول على نواتج محددة من التفاعلات الكيميائية. وازالة نواتج أخرى ومنع حدوثها، وقد كان الهدف من العمل هو إزالة مادة الفينول السامة من الماء وذلك بأضافة مادة من أشباه الموصلات كمحفز للتفاعل الكيميائي محاكاة لحالة وجود الفينول في الماء الملوث.

تم استخدام مادتي أكسيد الحديد وأكسيد الزنك كأشباه موصلات للتحفيز الضوئي وبأوزان مختلفة.

تم استخدام نوعين من المصادر الضوئية في المنطقة فوق البنفسجية احدهما مشاكله، طوله الموجي 662 نانومتر وهو التوافقية الثانية الناتجة من ليزر الثنائي ذي الطول الموجي 532 نانومتر. باستخدام بلوره بصري غير خطيه من مادة BBO. والمصدر الثاني هو الثنائي الباعث للضوء ذي الطول الموجي 395 نانومتر. سجلت اطيف الفينول لعينات من الفينول والماء ومادة شبه الموصله قبل وبعد التشعيع وتم دراسة اثر وزن المادة شبه الموصله واثر قطر حزمة المصدر الضوئي. اثر زمن ت_HERE

بنت نتایج هذه الدراسة أنه بزيادة وزن المادة المحفزة (شبه الموصل) وزيادة زمن تعرض المادة المحفزة للضوء، ونقصان قطر ضوء أحادي اللون المحفز، تزداد فعالية أزالة الفينول السام من الماء.
بينت النتائج كذلك ان أفضل قيم للمعاملات التي حدثت عندها
ازالة تامه للفينول كانت عند زمن تشعيع 30دقيقه بالثنائي الباعث
للضوء، 600 ملجرام من وزن مادة اكسيد الحديد، 2.3 سنتيمتر
قطرالشعاع.
اعتلت النتائج المتحصله من التشعيع بالليزر كفاءه أقل من تلك المتحصله
بالتشعيع بالثنائي وذلك نسبة الى القدرة الواطه للليزر (6mW) مقارنة
بقدرة الثنائي (1W)