

## أجندة طالب الدراسات العليا



أسم الطالب : رهام سليم محمد كاظم

التخصص : بيئته وصحيه

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أسماء لجنة المناقشه :

رئيسا	الجامعه التكنولوجيه /قسم هندسة البناء والأنشاءات	١	أستاذ دكتور رياض حسن هادي
عضوا	الجامعه التكنولوجيه /قسم الهندسة الكيمياوي	٢	أستاذ دكتور قصي فاضل الصالحي
عضوا	جامعة السليمانية/ كلية الهندسة	٣	مدرس الدكتور أكو رشيد حمه
عضوا ومشرفا	الجامعه التكنولوجيه /قسم هندسة البناء والأنشاءات	٤	استاذ مساعد دكتور فارس حمودي محمد
عضوا ومشرفا	الجامعه التكنولوجيه /قسم الهندسة الكيمياوي	٥	استاذ دكتور محمد ابراهيم

أسم المقوم العلمي : أستاذ المساعد الدكتور باسم حسين جامعة بغداد /كلية الهندسه

أسم المقوم اللغوي : مدرس مساعد يقضان رضا مهدي الجامعة التكنولوجيه / مركز اللغة الانكليزيه

عنوان البحث للرسالة أو الاطروحة :

**Treatment of Highly Polluted Water with Phosphate using BAPPP-Nanoparticles.**

معالجة المياه الملوثة بتراكيز عالية من الفوسفات باستخدام حبيبات BAPPP النانويه.

عناوين البحوث المستله:

1- Phosphate remediation from water using low cost limestone filter.

تقدير المناقشه: امتياز



## مستخلص البحث

The present investigation has been conducted to explore the applicability of nanomaterials to develop an efficient and cost-effective filtration media. To achieve the targeted plan, three low cost materials, namely dolomite, limestone, and bottom ash of power production plants (BAPPP), were subjected to a series of physical and chemicals tests to check their suitability to develop the nano-filtration media. This series of tests included particle size distribution, uniformity coefficient, specific surface area, specific gravity, residence time distribution, chemical composition. Then, these materials were applied, experimentally; to remediate phosphate from water under batch flow conditions.

Generally, the results obtained indicated that the studied three materials posse the capability to remediate phosphate at different efficiencies. BAPPP was able to remove about 98% of phosphate, followed by limestone at about 47%, and dolomite at 31%. Therefore, BAPPP was selected as a raw material to manufacture the new nano-coated filtration media, where a sample of this by-product material

was grinded down into average particle size of 100 nm and then applied to coat clean sand grains.

It has been found that the nano-coated filtration media has shortened the required treatment time to reduce phosphate concentration (0.1 mg/l) by about 37.27%. Where, the traditional filtration media required about 220 min to reduce the phosphate concentration to the WHO limitation, while the new nano-coated media required only 138 min. Economically, it has been found that employing the nano-technology in filtration units remarkably reduces material consumption. Where, in traditional filtration units, 750 g of the raw BAPPP material was required to reduce the concentration of phosphate to 0.1 mg/L. While in the new filtration (nano-coated media) unit, 45 g of the raw BAPPP material was required to achieve the same phosphate removal efficiency. Additionally, application of the nano-technology in filtration units is of a great benefit for the environment as it significantly conserves the resources of raw filtration materials, especially when these raw materials are naturally occur in the earth's crust such as kaolinite, montmorillonite, and limestone.

**Keywords:** phosphate, nanoparticles, Bottom ash of power production plants, water pollution.