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## Investigation of nigrosine, alizarin, indigo and acid fuchsin removal by modification of CaO derived from eggshell with AgI: Adsorption, kinetic and photocatalytic studies

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### RESEARCH ARTICLE

### ABSTRACT



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### KEYWORDS

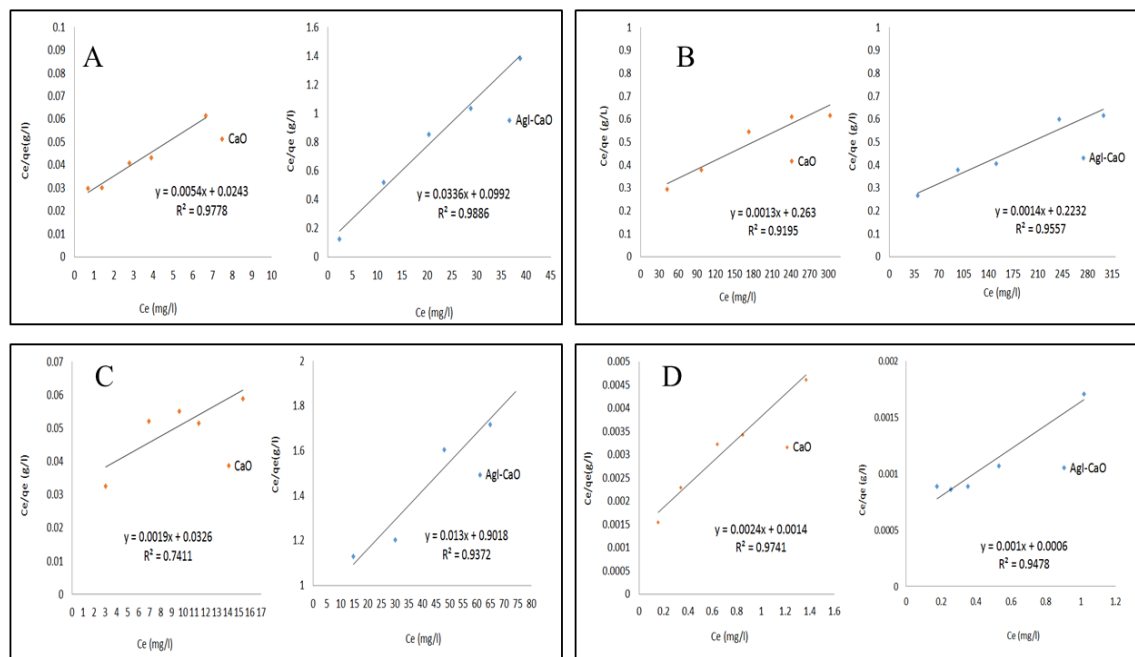
SEM  
 TEM  
 Kinetics  
 Adsorption  
 Modification  
 Photocatalytic

Successful removal of nigrosine, alizarin, indigo and acid fuchsin dyes from aqueous solutions using modified CaO nanoparticles has been investigated. The CaO was obtained from eggshells and modified with AgI. The adsorbents were characterized using X-ray diffraction, energy dispersive X-ray spectroscopy, scanning electron microscopy and transmission electron microscopy. The kinetic studies were also investigated, the results showed that the adsorption of alizarin dye follows the pseudo-first-order model, while the adsorption of the nigrosine, indigo, and acid fuchsin follow the pseudo-second-order model onto modified and unmodified CaO. Moreover, the photocatalytic activity of modified adsorbent was tested under sunlight. The modified adsorbent showed a strong photocatalytic activity, a 0.01 g modified adsorbent was sufficient to absorb 100% of acid fuchsin through only 5 min after exposes to sunlight.

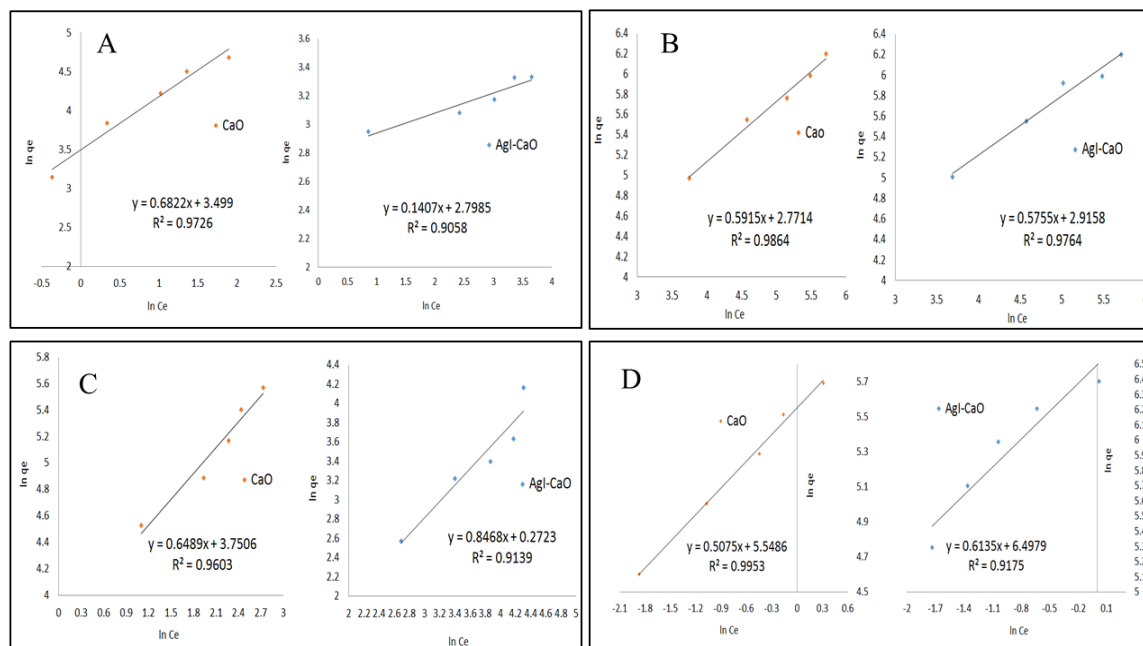
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### Supplementary Materials



**Figure S1.** Langmuir isotherm onto CaO and AgI/CaO of nigrosine (A), alizarin (B), indigo (C) and acid fuchsin (D).



**Figure S2.** Freundlich isotherm onto CaO and AgI/CaO of nigrosine (A), alizarin (B), indigo (C) and acid fuchsin (D).

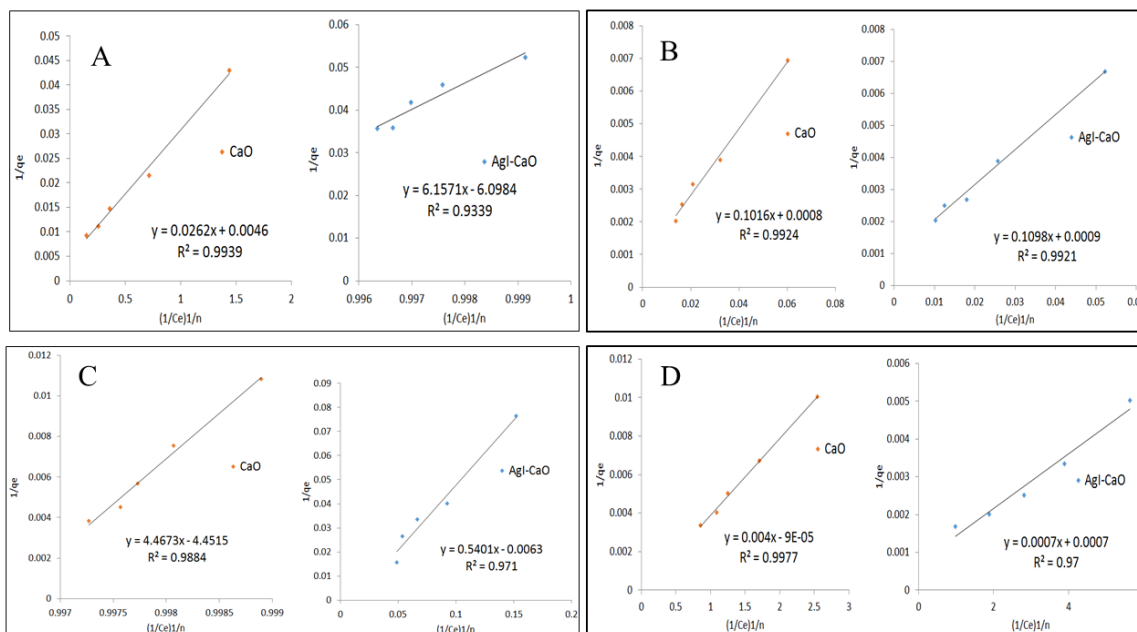


Figure S3. Sips isotherm onto CaO and AgI/CaO of nigrosine (A), alizarin (B), indigo (C) and acid fuchsin (D).

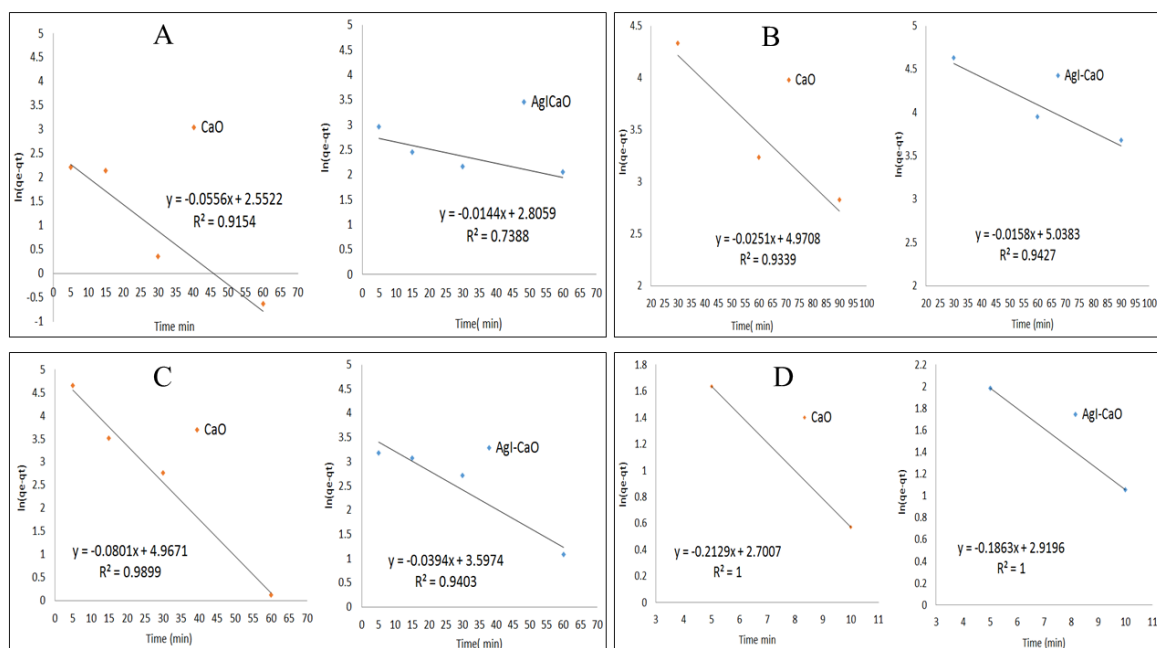
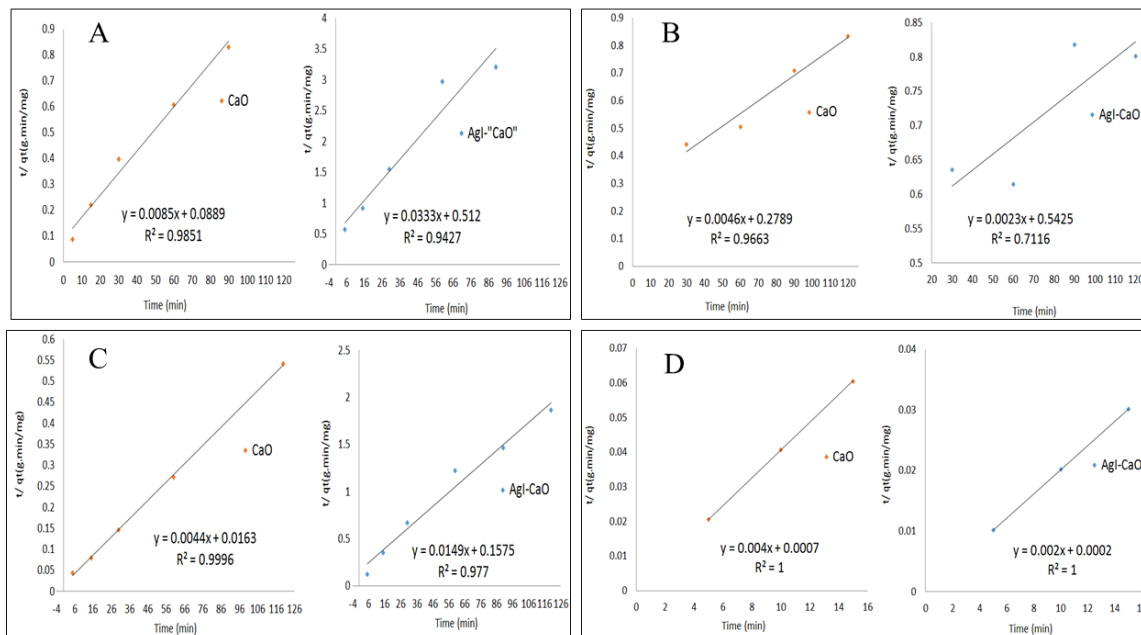


Figure S4. Pseudo-first order kinetic onto CaO and AgI/CaO of nigrosine (A), alizarin (B), indigo (C) and acid fuchsin (D).



**Figure S5.** Pseudo-second order kinetic onto CaO and AgI/CaO of nigrosine (A), alizarin (B), indigo (C) and acid fuchsin.



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