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The oxygen-rich pentaerythritol modified multi-walled carbon nanotube as an efficient adsorbent for aqueous removal of alizarin yellow R and alizarin red S

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Highlights

- Preparation and characterization of ox-MWCNT-PER was performed.
- Aqueous removal of AYR and ARS by ox-MWCNT-PER was investigated.
- The adsorption properties of ox-MWCNT-PER for AYR and ARS were evaluated.

Abstract: A contrastive work on the removal of two organic dyes, alizarin yellow R (AYR) and alizarin red S (ARS), was carried out by utilizing pentaerythritol modified multi-walled carbon nanotubes (ox-MWCNT-PER) as a highly efficient adsorbent. Various characterization methods such as scanning electron microscopy (SEM), thermogravimetric analysis (TGA), Fourier transform infrared (FTIR) spectroscopy, the Brunauer-Emmett-Teller (BET) analysis and X-ray photoelectron spectroscopy (XPS), were applied for revealing the physical and chemical properties of the as-prepared material. In addition, the adsorption kinetics, isotherms and thermodynamic parameters were also discussed. The results showed that the time required to achieve the adsorption equilibrium for both dyes was about 30 min, and the increase in temperature was not favorable to the adsorption process. It was worth noting that the

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