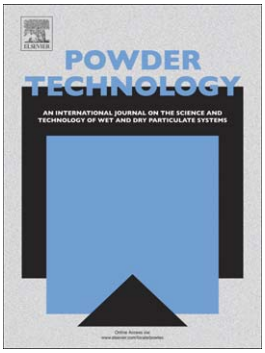

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PII: S0032-5910(17)30952-X
DOI: doi:10.1016/j.powtec.2017.12.001
Reference: PTEC 12990

To appear in: *Powder Technology*

Received date: 13 September 2017
Revised date: 28 October 2017
Accepted date: 1 December 2017

Please cite this article as: Mohamed E. Mahmoud, Saad S.M. Hassan, Ayman H. Kamel, Mahmoud I.A. Elserw, Development of microwave-assisted functionalized nanosilicas for instantaneous removal of heavy metals, *Powder Technology* (2017), doi:10.1016/j.powtec.2017.12.001

Development of microwave-assisted functionalized nanosilicas for instantaneous removal of heavy metals

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Abstract

Nanosilica (N-Si) sorbent was functionalized by salicylic acid (N-Si-Sa) and succinic acid (N-Si-Su) utilizing mechanochemical blending and microwave-assisted reaction under solvent free conditions. The surface alteration of nanosilica particles was examined utilizing different techniques. N-Si-Sa and N-Si-Su sorbents were employed to remove Cd(II), Pb(II) and Hg(II) from water matrices utilizing microwave-enforced sorption (MES) technique as a powerful, quick and green approach. The MES values of Cd(II), Hg(II) and Pb(II) were characterized as 1100, 750 and 1000 μmol g^{-1}, respectively utilizing 10 mg of N-Si-Sa and 15 sec of microwave warming as well as 1100, 650 and 1000 μmol g^{-1}, respectively by utilizing N-Si-Su under the same conditions. The sorption behaviors of metals by N-Si-Sa and N-Si-Su were described by Langmuir and Freundlich isotherm models. The functionalized nanosilica sorbents were effectively connected for adsorptive treatment of the three analyzed metals from various water samples with superb recovery estimations through the productive utilization of MES technique. The collected data displayed a superior and excellent solid phase extraction procedure for treatment of the three analyzed metals from their matrices in few seconds utilizing the MES strategy.