

Article

Conversion of Industrial Sludge into Activated Biochar for Effective Cationic Dye Removal: Characterization and Adsorption Properties Assessment

Salah Jellali ^{1,*}, Ahmed Amine Azzaz ², Majida Al-Harrasi ¹, Yassine Charabi ³, Jamal Nasser Al-Sabahi ⁴, Ahmed Al-Raeesi ¹, Muhammad Usman ⁵, Noura Al Nasiri ¹, Mohammed Al-Abri ^{6,7} and Mejdi Jeguirim ^{8,*}

¹ Centre for Environmental Studies and Research, Sultan Qaboos University, Al-Khoud 123, Oman; s.jelali@squ.edu.om (S.J.); mageda502@gmail.com (M.A.-H.); aalraeesi@squ.edu.om (A.A.-R.); noura@squ.edu.om (N.A.-N.)

² EDYTEM (UMR5204), CNRS, Université Savoie Mont-Blanc, F-73000 Chambéry, France; ahmed-amine.azzaz@univ-smb.fr

³ Department of Geography, College of Arts and Social Sciences, Sultan Qaboos University, Al-Khoud 123, Oman; yassine@squ.edu.om

⁴ College of Agriculture and Marine Sciences, Sultan Qaboos University, Al-Khoud 123, Oman; jamal@squ.edu.om

⁵ PEIE Research Chair for the Development of Industrial Estates and Free Zones, Center for Environmental Studies and Research, Sultan Qaboos University, Al-Khoud 123, Oman; muhammad.usman@squ.edu.om

⁶ Nanotechnology Research Centre, Sultan Qaboos University, Al-Khoud 123, Oman, alabri@squ.edu.om

⁷ College of Engineering, Sultan Qaboos University, Al-Khoud 123, Oman

⁸ The Institute of Materials Science of Mulhouse (IS2M), CNRS, University of Haute Alsace, UMR 7361, F-68100 Mulhouse, France

* Correspondence: s.jelali@squ.edu.om (S.J.); mejdi.jeguirim@uha.fr (M.J.)

Supplementary materials

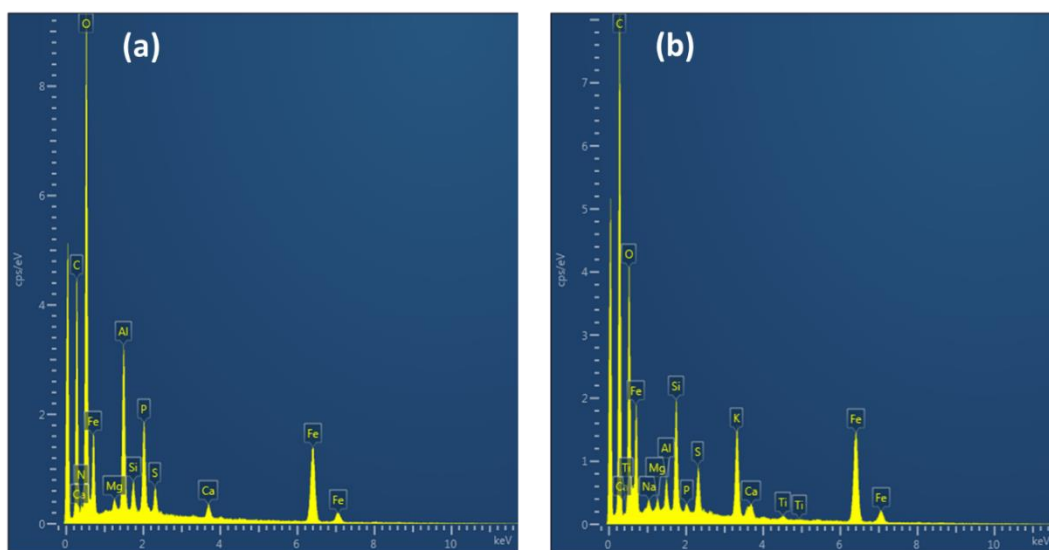


Figure S1. EDX specters of (a) IS-R and (b) IS-B-KOH.

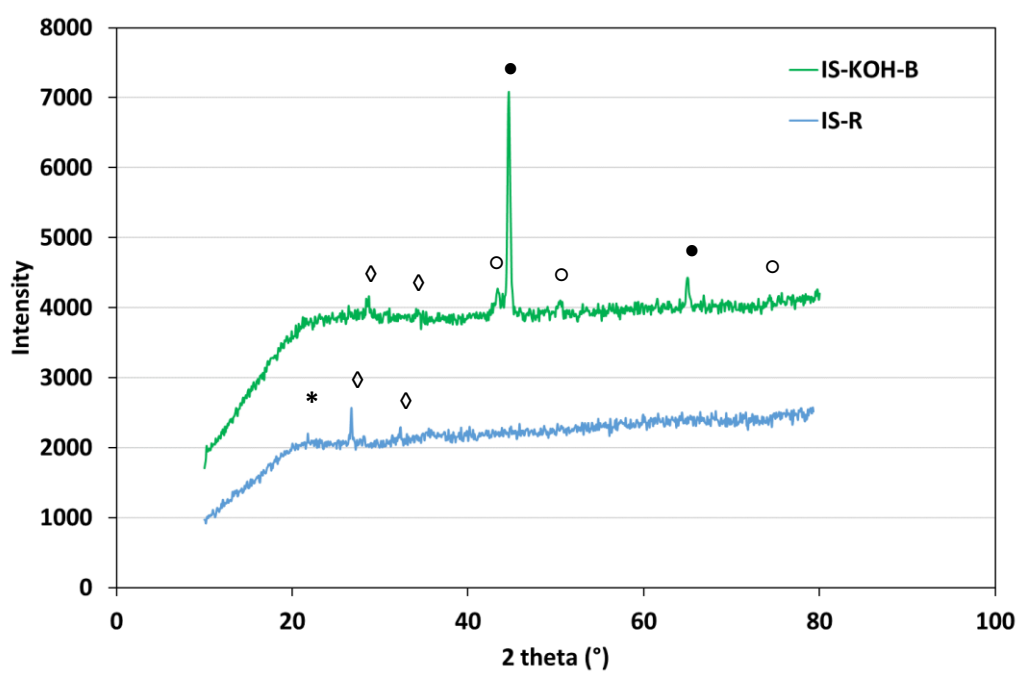


Figure S2. XRD diffractograms for IS-R and IS-KOH-B before and after MB adsorption (*: Cellulose I, ◇: SiO₂, ○: Fe₃C, ●: Fe,Ni).

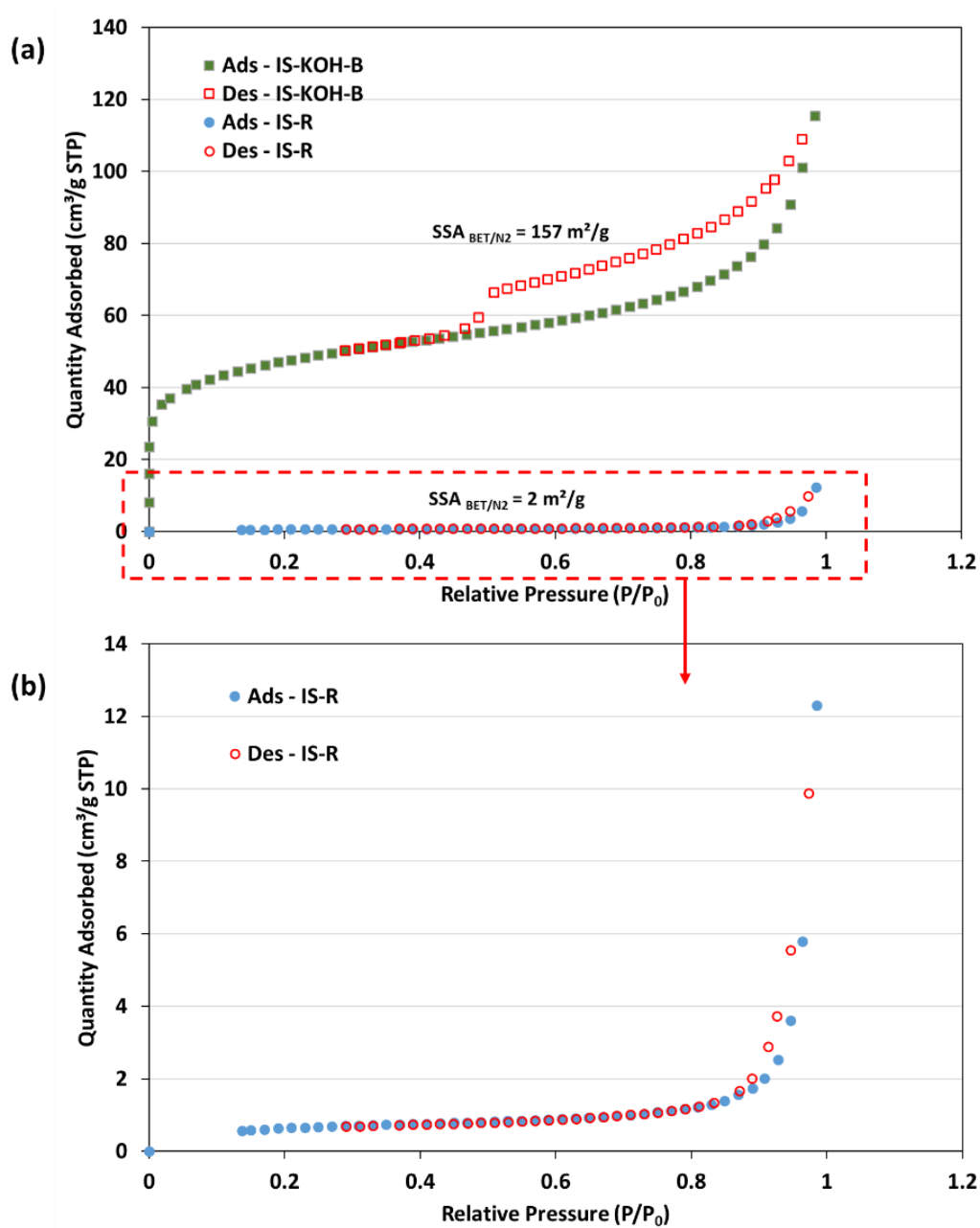


Figure S3. N₂ Adsorption/desorption isotherm (77K) for (a) IS-KOH-B and IS-R and (b) a detailed IS-R isotherm.