

Supplementary Materials

Efficient Removal of Organic Dye from Aqueous Solution Using Hierarchical Zeolite-Based Biomembrane: Isotherm, Kinetics, Thermodynamics and Recycling Studies

Sabarish Radoor ^{1,*}, Jasila Karayil ², Aswathy Jayakumar ¹, Jaewoo Lee ^{3,4}, Debabrata Nandi ¹, Jyotishkumar Parameswaranpillai ⁵, Bishweshwar Pant ^{6,7,*}, Suchart Siengchin ^{1,8,*}

¹ Materials and Production Engineering, The Sirindhorn International Thai-German Graduate School of Engineering (TGGS), King Mongkut's University of Technology North Bangkok, Bangkok 10800, Thailand; aswathyjayakumarj@gmail.com (A.J.); nandi.debabrata87@gmail.com (D.N.)

² Government Women's Polytechnic College, Calicut 673009, India; jessekarayil@gmail.com

³ Department of Polymer-Nano Science and Technology, Jeonbuk National University, 567 Baekje-daero, Deokjin-gu, Jeonju-si 54896, Korea; jaewoolee@jbnu.ac.kr

⁴ Department of Bionanotechnology and Bioconvergence Engineering, Jeonbuk National University, 567 Baekje-daero, Deokjin-gu, Jeonju-si 54896, Korea

⁵ Department of Science, Alliance University, Bengaluru 562106, India; jyotishkumarp@gmail.com

⁶ Carbon Composite Energy Nanomaterials Research Center, Woosuk University, Wanju 55338, Korea

⁷ Woosuk Institute of Smart Convergence Life Care (WSCLC), Woosuk University, Chonbuk, Wanju 55338, Korea

⁸ Institute of Plant and Wood Chemistry, Technische Universität Dresden, Piennner Str. 19, 01737 Tharandt, Germany

* Correspondence: sabarishchem@gmail.com (S.R.); bisup@woosuk.ac.kr (B.P.); suchart.s.pe@tggs-bangkok.org (S.S.)

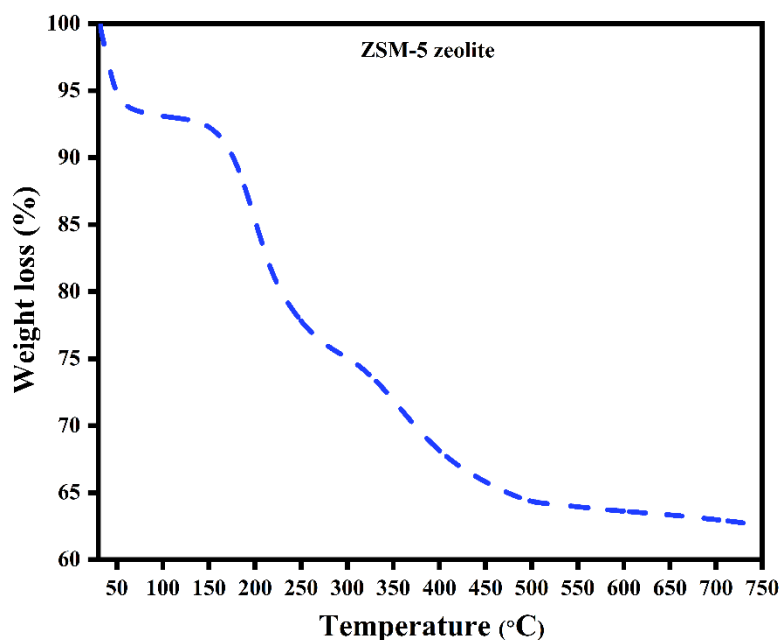


Figure S1: Thermogravimetric (TGA) of ZSM-5 zeolite

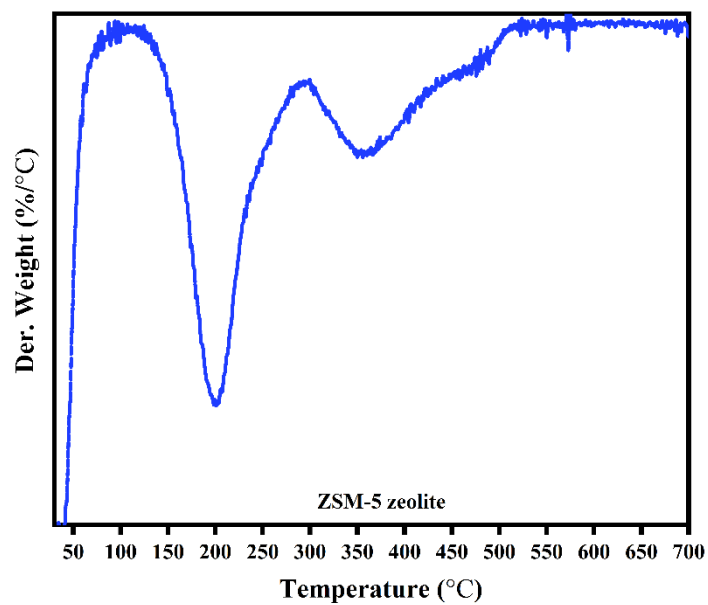


Figure S2: Differential thermal analysis (DTA) curves of of ZSM-5 zeolite