

Supplementary Information (S.I)

Amine-assisted Ionothermal Synthesis of In-plane Oriented AEL Molecular Sieve Corrosion-resistant Coatings

Wenche Wu^{‡1}, Yinuo Han^{‡1}, Xiaoming Yu¹, Nan Li¹, Yuanxin Cao¹, Qiang Chen^{*1}, Tongwen Yu^{*1}

¹School of Chemical Engineering and Technology,
The Key Lab of Low-Carbon Chemistry & Energy Conservation of Guangdong Province
Sun Yat-sen University, Zhuhai 519082, China

*Corresponding author: Email: chenqiang3@mail.sysu.edu.cn, yutw@mail.sysu.edu.cn

Experimental

The synthesis experiment was carried out in a 50ml open beaker with 15.3g [EMIM]Br (or 17.5g [BMIm]Br) as the solvent. Then 0.86g phosphoric acid (H₃PO₄, 85 wt.% in water), 0.1g hydrofluoric acid (HF, 40 wt.% in water) and several quats additives were added and stirred at 90°C for 30min. Quats additives include 4-ethylaniline, 4-butylamine, and p-Toluidine. Put the aluminum sheet into the bottom of the teflon lined stainless steel reactor, add the synthetic liquid, and then the reactor was programmed to rise for 30 min to 170-190°C for 4-8h reaction. Finally, the aluminum sheet was taken out and blow-dried with nitrogen and dried in an oven at 80°C. After cooling to room temperature, wash with water and ethanol, blow dry with nitrogen and dry at 80°C in oven. All samples were characterized by Ultima IV X-ray diffractometer and Quanta 400 FEG field emission scanning electron microscope. The measurement of DC polarization for anti-corrosion performance was measured at room temperature using a 3.5% NaCl solution as the corrosive solution, a bare aluminium substrate or an aluminium sheet covered with a molecular sieve film as the working electrode, a Pt sheet as the counter electrode and (Ag/AgCl)/KCl (3.5M) as the reference electrode. The Tafel polarisation curves were scanning with a scanning range of 0V to -1.6V and a scanning speed of 5 mV/s.

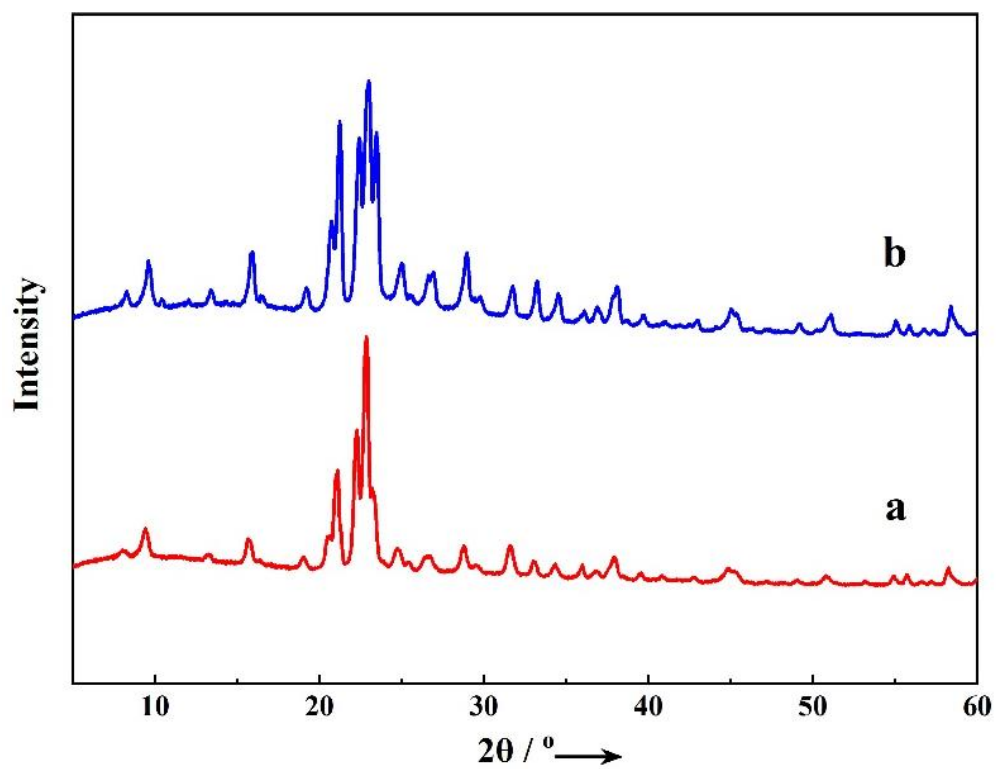


Fig. S1 XRD images of products at three different amine/ILs ratios after adding 4-ethylaniline. (a) $x=1.25$; (b) $x=2.5$

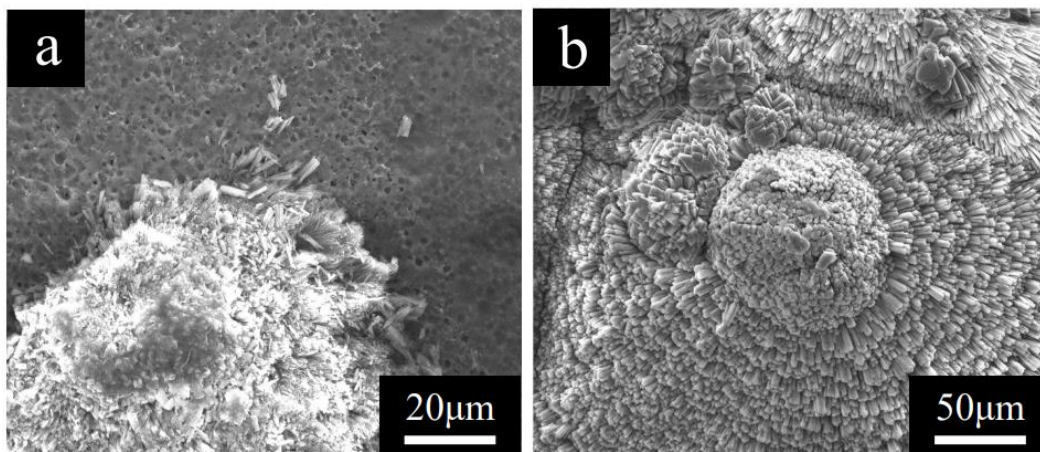


Fig. S2 SEM images of products at different amine/ILs ratios after adding 4-ethylamine. (a) $x=1.25$; (b) $x=2.5$