

Size-dependent Solution Mediated Phase Transformation of Piroxicam Monohydrate Particles

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It is hard to measure the concentrations of piroxicam in the home-made cell using in situ techniques because of its small volume, the scale-up experiments at the same conditions with the ex-situ High-Performance Liquid Chromatography (HPLC) method were performed to monitor the concentration of piroxicam during the SMPT process. 500 mg PMPs with different sizes were added into 50 ml unsaturated solution (21.5 mg/ml, 99% acetone-1% H₂O). These SMPT experiments were conducted without stirring at 31°C. 0.5 ml aliquots were withdrawn from the bottom of solution with time, filtered by a 0.1 µm syringe tip. 0.1 ml out of the 0.5 ml aliquots was diluted to 60 times using acetonitrile for the concentration analysis by HPLC (repeated three times to estimate the error by the dilution process). The acetonitrile and 0.05 mol/L phosphate buffer water solution (35:65 v/v) was selected as the mobile phase to deliver the piroxicam with a flow rate of 1 ml/min and 20 min running time. The UV absorbance at 360 nm was used to quantify the piroxicam which could be detected at around 16 min.

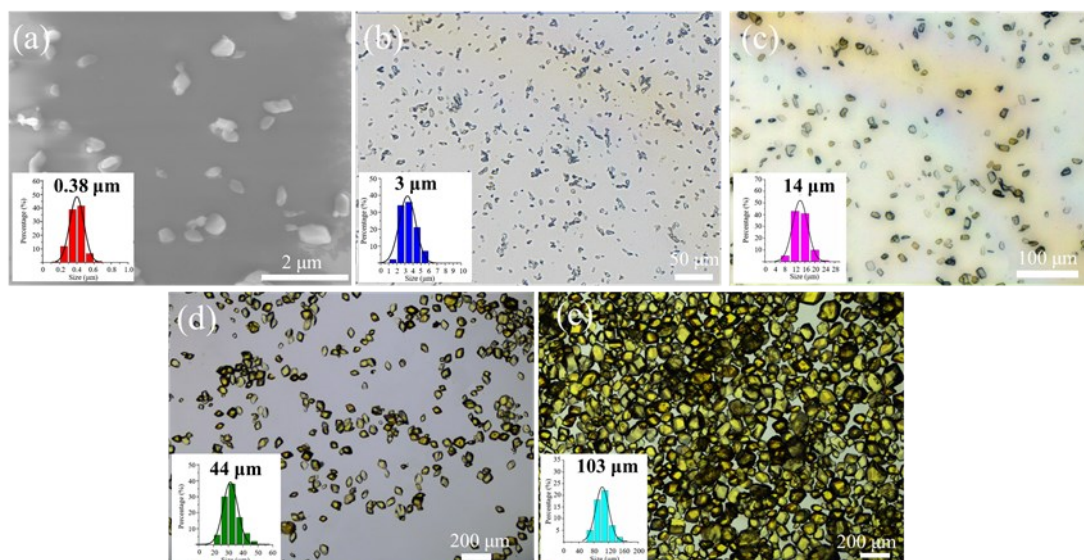


Fig. S1 The SEM or microscope photos and size distributions of the PMPs with different sizes: (a) 0.38 µm; (b) 3 µm; (c) 14 µm (d) 44 µm (e) 103 µm. The PMPs with different sizes were prepared by SMPT of Form I in 96% acetone-4% H₂O with different stirring speed and temperature (3 µm, 800 r/min, RT; 14 µm, 10 r/min, RT; 44 µm, 0 r/min, RT; 103 µm, 0 r/min,

40 °C) or by grinding (0.38 μm , grinding the 3 μm PMPs manually in the mortar for 10 minutes). The size distribution of PMPs was obtained by measuring 300 different crystals using microscope (3 μm , 14 μm , 44 μm 103 μm) or by Zetasizer with dynamic light scattering method (0.38 μm).

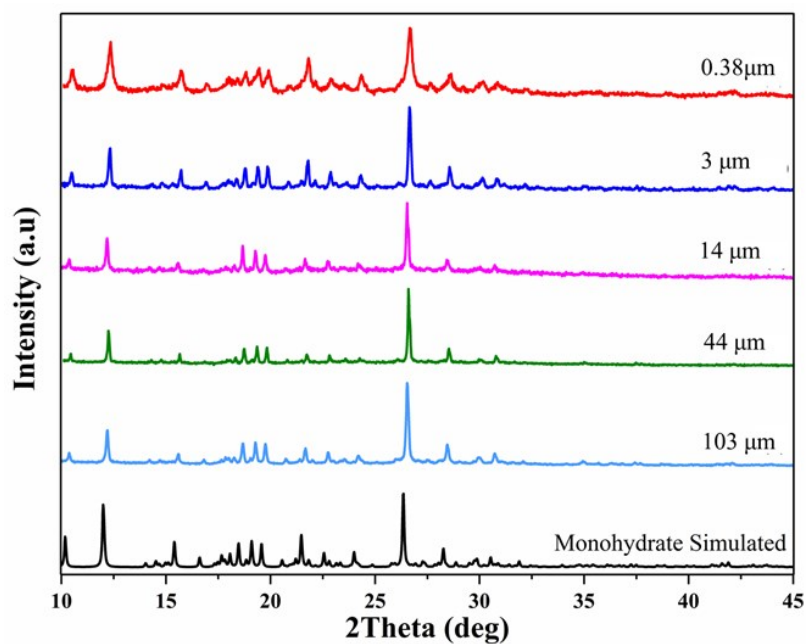


Fig. S2 The PXRD patterns of PMPs with different sizes.

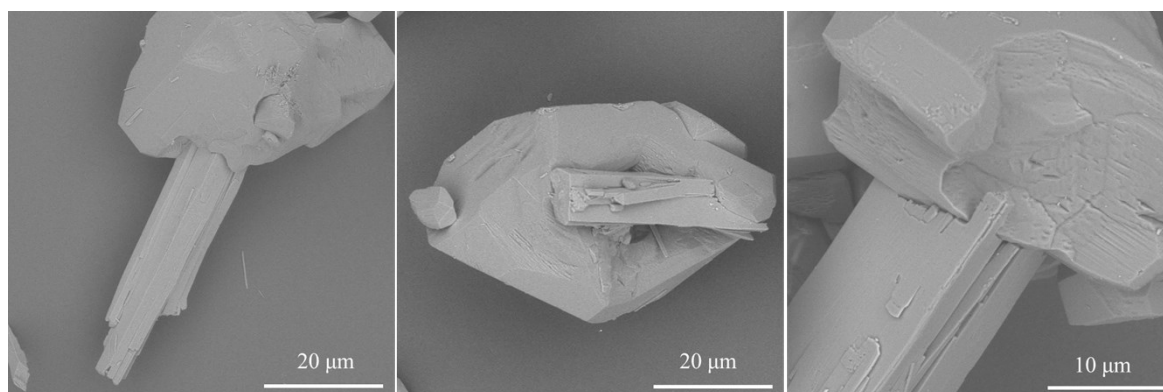


Fig. S3 The SEM images of the crystallization of piroxicam form II on the surface of different piroxicam monohydrate crystals.