

## **Supporting information**

# **Aqueous synthesis of manganese phosphate hydrate crystals for creating inorganic pigment materials**

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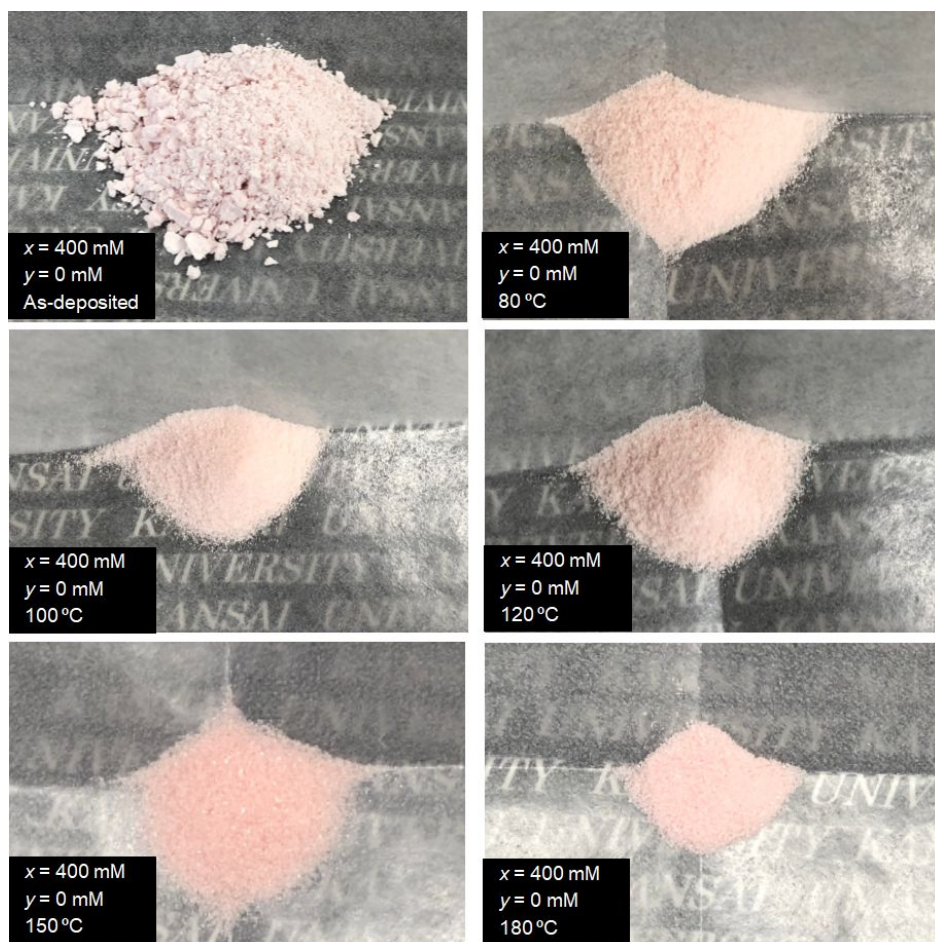


Figure S1. Appearance of the as-deposited and manganese phosphate hydrate samples of  $x = 400 \text{ mM}$  and  $y = 0 \text{ mM}$  prepared by aging at  $80^\circ\text{C}$  or by hydrothermal treatment at  $100\text{--}180^\circ\text{C}$  for 1 day.

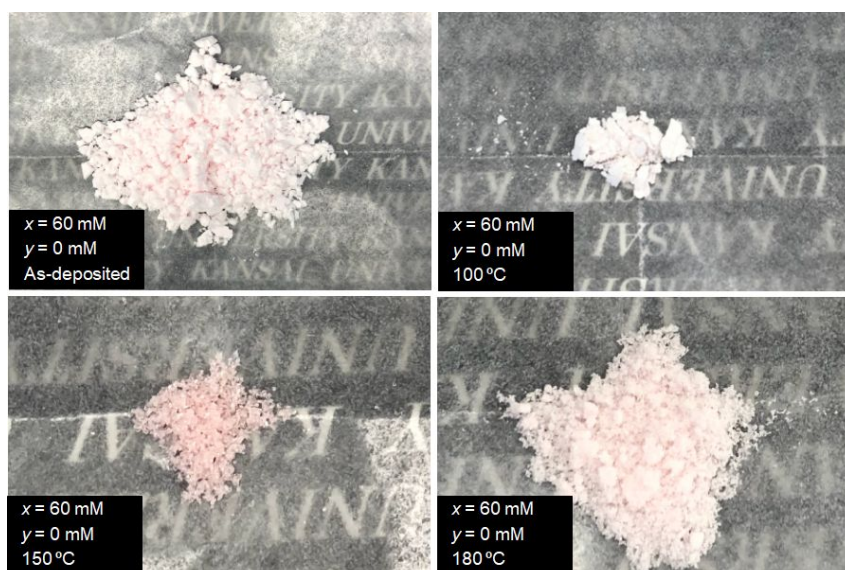


Figure S2. Appearance of the as-deposited and manganese phosphate hydrate samples of  $x = 60$  mM and  $y = 0$  mM prepared by hydrothermal treatment at 100–180 °C for 1 day.

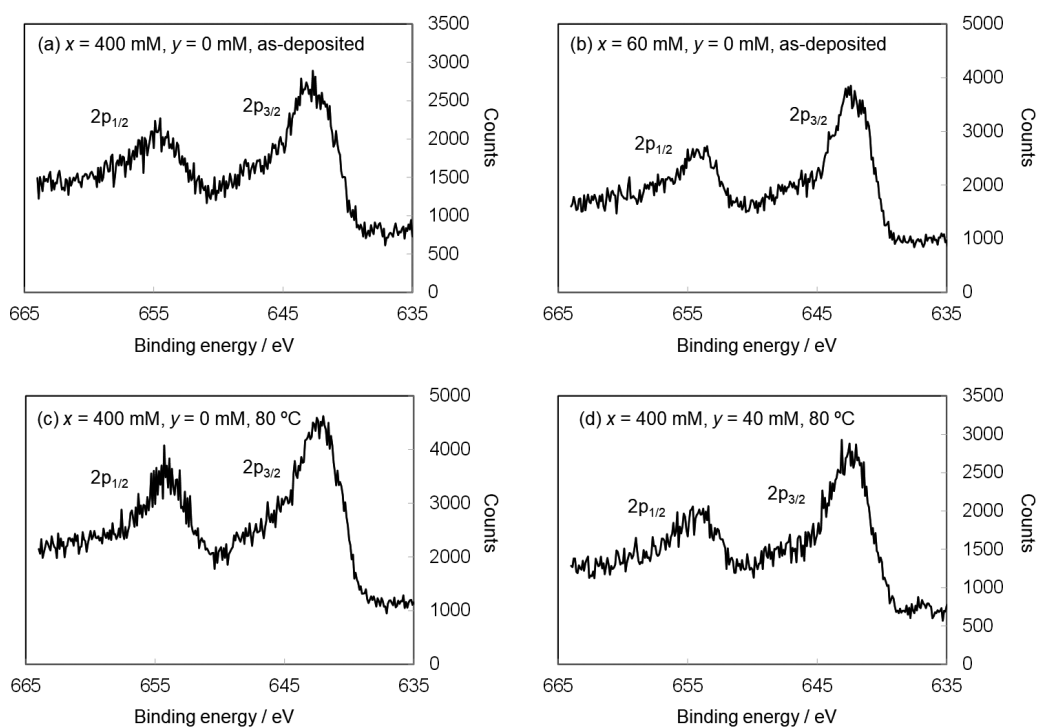


Figure S3. XPS spectra ( $\text{Mn}_{2p}$ ) of the as-deposited (a, b) and manganese phosphate hydrate (c, d) samples;  $x = 400$  mM,  $y = 0$  mM, as-deposited (a),  $x = 60$  mM,  $y = 0$  mM, as-deposited (b),  $x = 400$  mM,  $y = 0$  mM, 80 °C (c) and  $x = 400$  mM,  $y = 40$  mM, 80 °C (d).

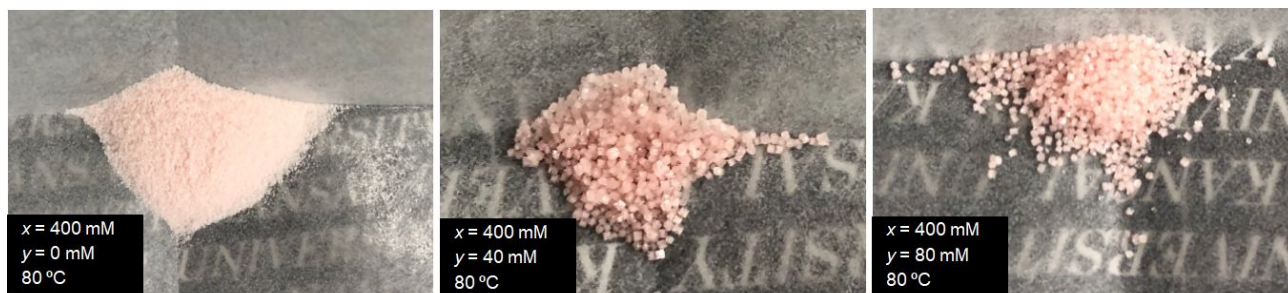


Figure S4. Appearance of the manganese phosphate hydrate samples of  $x = 400$  mM and  $y = 0$ – $80$  mM prepared by aging at  $80$  °C for 1 day.

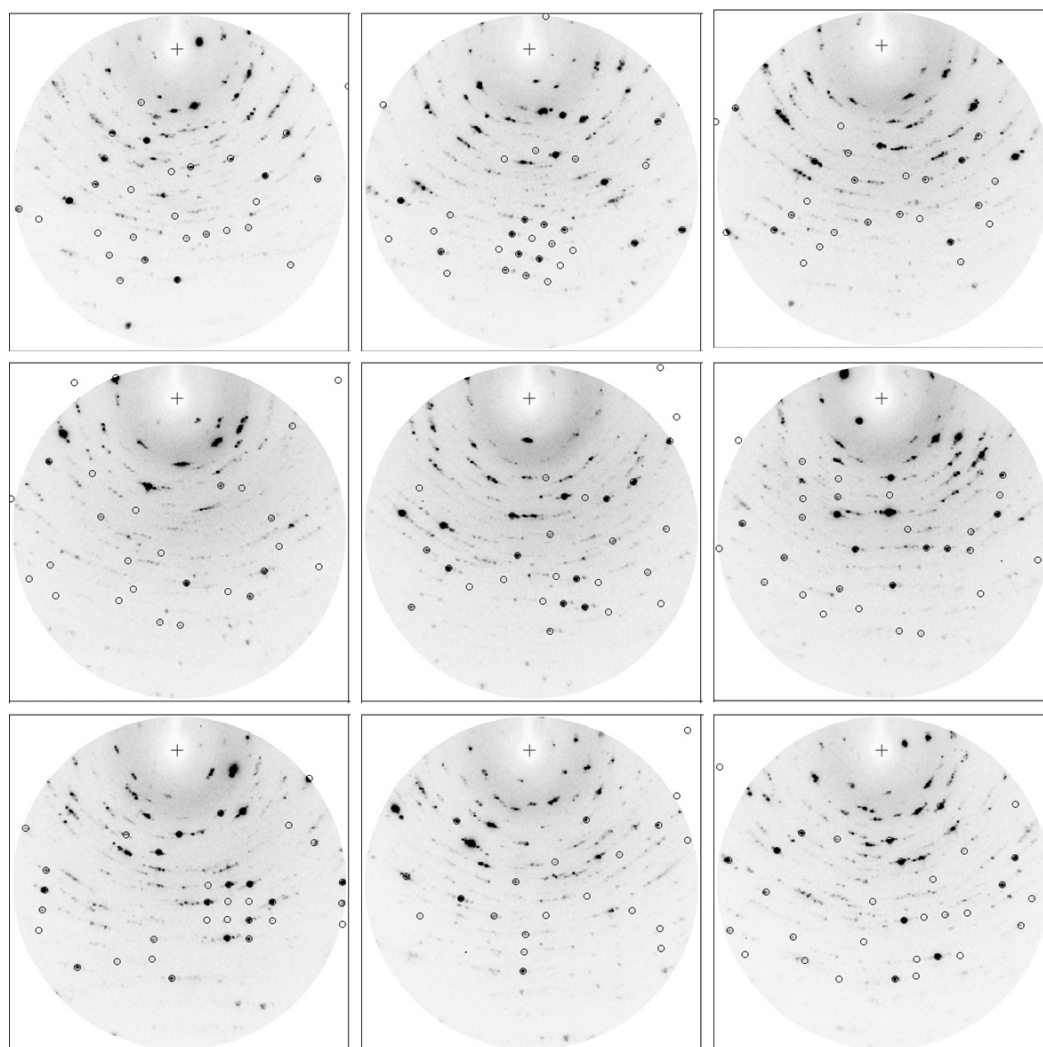


Figure S5. XRD images measured with a CCD detector of the manganese phosphate hydrate sample of  $x = 400$  mM and  $y = 40$  mM prepared by aging at  $80$  °C for 1 day.

\*The blue circles in the XRD images means the positions of the reflections predicted by calculation.

### **The detailed information of the single-crystal XRD analysis**

The lattice parameters were calculated to be  $a = 17.6941$ ,  $b = 9.1780$ ,  $c = 9.5437$ ,  $\alpha = 90.000$ ,  $\beta = 96.685$ , and  $\gamma = 90.000$ , where the standard uncertainty ( $\sigma$ ) of these parameters were  $a$ : 0.0265,  $b$ : 0.0132,  $c$ : 0.0145,  $\alpha$ : 0,  $\beta$ : 0.0206 and  $\gamma$ : 0, respectively. The 1745 reflections out of a total of 2229 were assigned to the present monoclinic cell (ca. 78.3%). The resolution,  $2\theta_{\text{MAX}}$  (Mo  $K\alpha$ ), was  $54.97^\circ$ .