Supplementary Information

The dried $CaCO_3$ powder is put into a sample table of X-ray diffractometer (Rigaku, D/MAX-RB, Japan). The wavelength of X-ray is 0.154184 nm (Cu $K_{\alpha1}$=1.5406, Cu $K_{\alpha2}$=1.54439, Ratio=0.5). The step length of sample rotation is 0.01º (theta) and of the detector is 0.02º (2theta). The XRD patterns of $CaCO_3$ powder prepared under different conditions are shown in Figure 1 and 2.

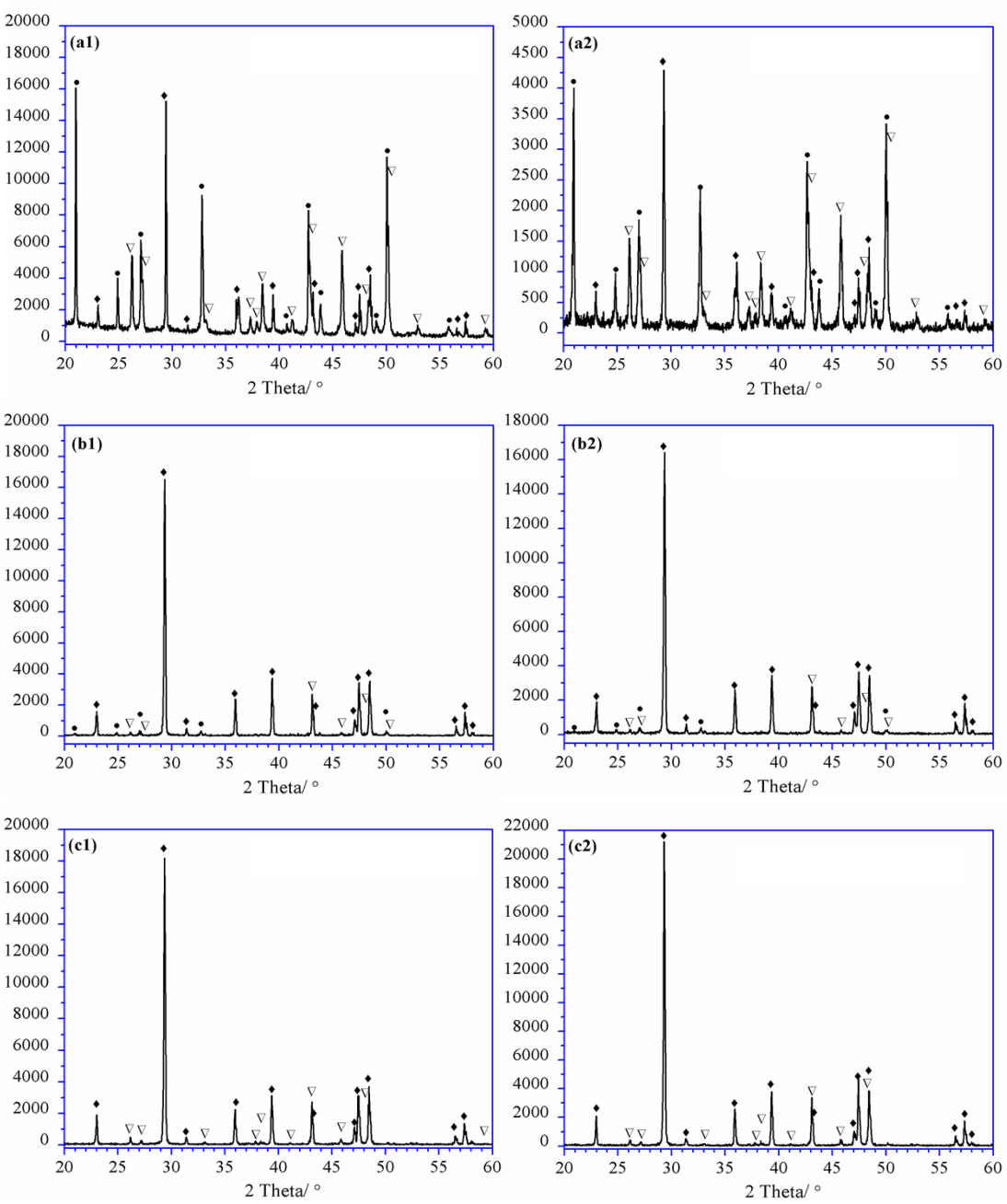

Figure 1 XRD patterns of $CaCO_3$ prepared at the first time (1) and the second time (2) under the stirring rate of 0 rpm (a), 100 rpm (b) and 500 rpm (c) from the decomposition of $Ca(HCO_3)_2$ solution. (Note: ♦ Calcite ∇ Aragonite • Vaterite; 0, 100 and 500 rpm corresponds to the agitation condition of static, moderate and intense agitation respectively.)

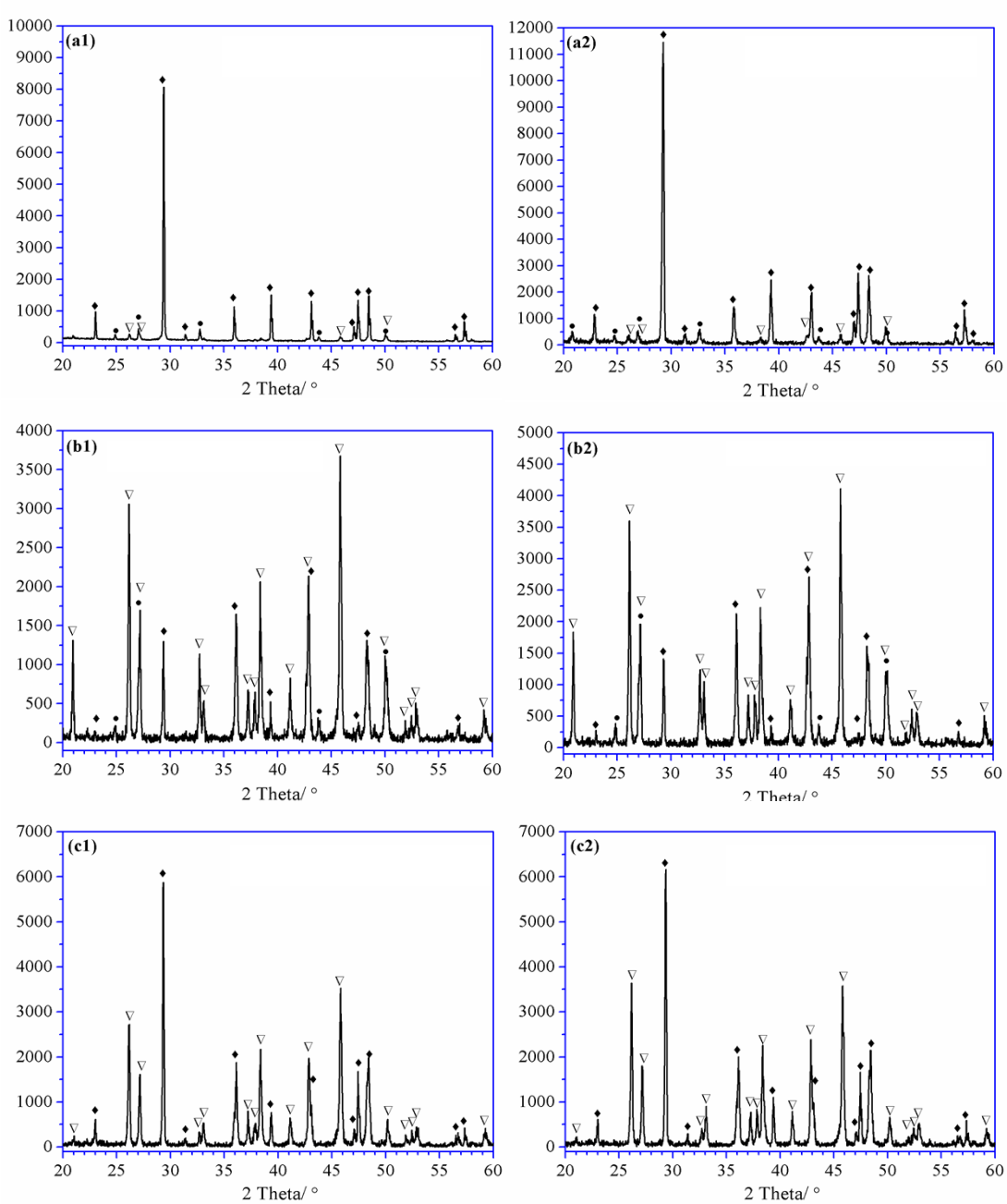

Figure 2 XRD patterns of $CaCO_3$ prepared at the first time (1) and the second time (2) at the stirring rate of 0 rpm (a), 100 rpm (b) and 500 rpm (c) from the decomposition of $Ca(HCO_3)_2$ solution in the presence of PEG-6000. (Note: ♦ Calcite ∇ Aragonite • Vaterite; 0, 100 and 500 rpm corresponds to the agitation condition of static, moderate and intense agitation respectively.)