

Supporting Information

Hydrothermal conversion of macroalgae-derived alginate to lactic acid catalysed by metal oxides

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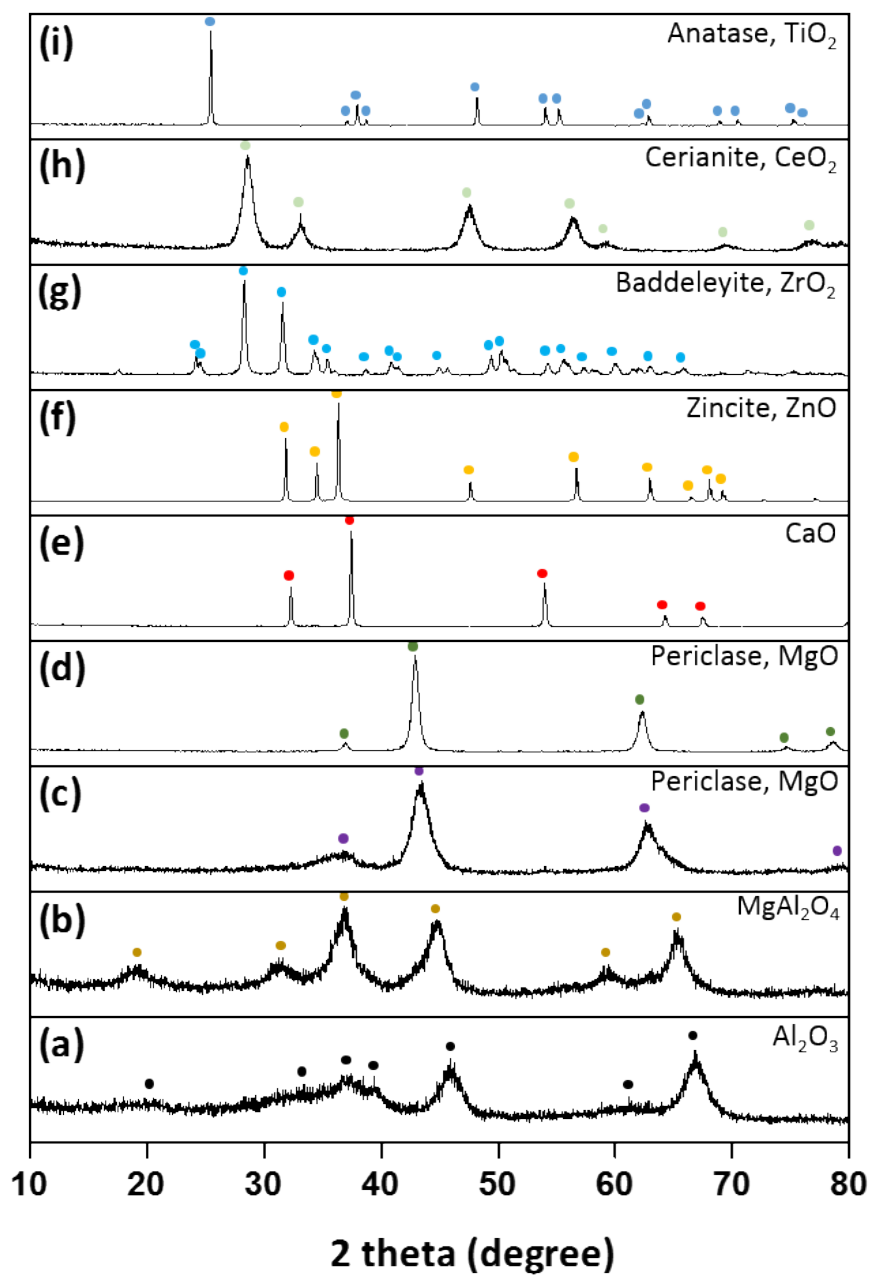


Fig. S1. X-ray diffraction patterns of prepared metal oxide catalysts: (a) Al_2O_3 , (b) $\text{Mg}_{30}\text{Al}_{70}$, (c) hydrotalcite, (d) MgO , (e) CaO , (f) ZnO , (g) ZrO_2 , (h) CeO_2 , (i) TiO_2 .

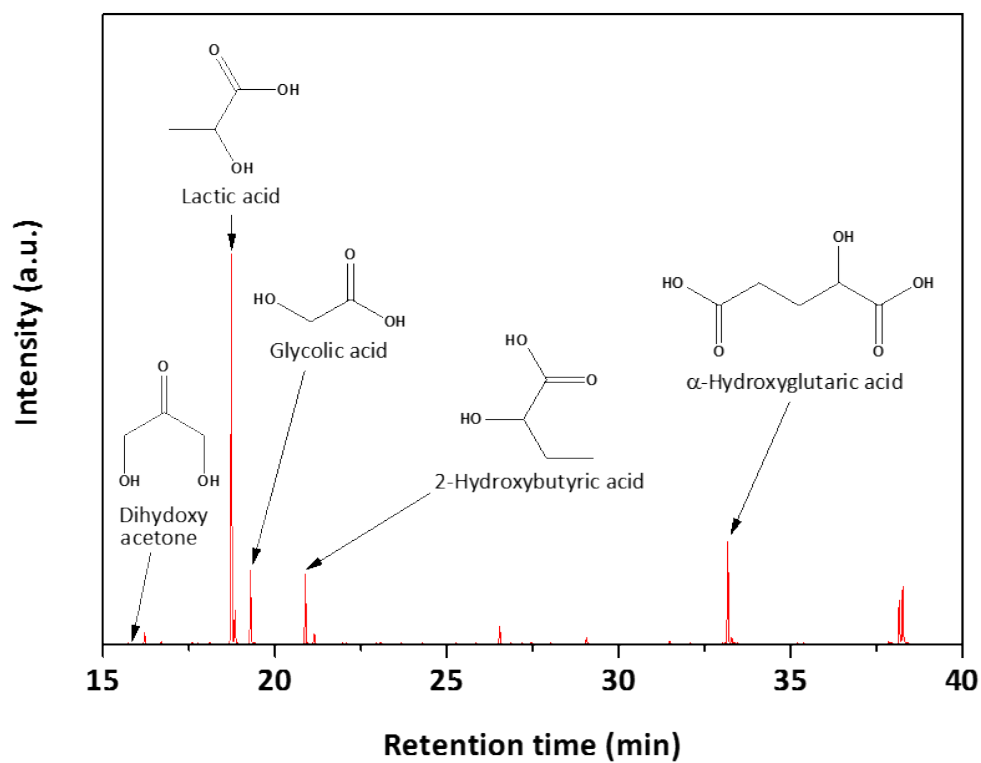


Fig. S2. GC-MS chromatogram of a TMS-silylated sample obtained by hydrothermal treatment of alginate over CaO at 200 °C for 1 h.

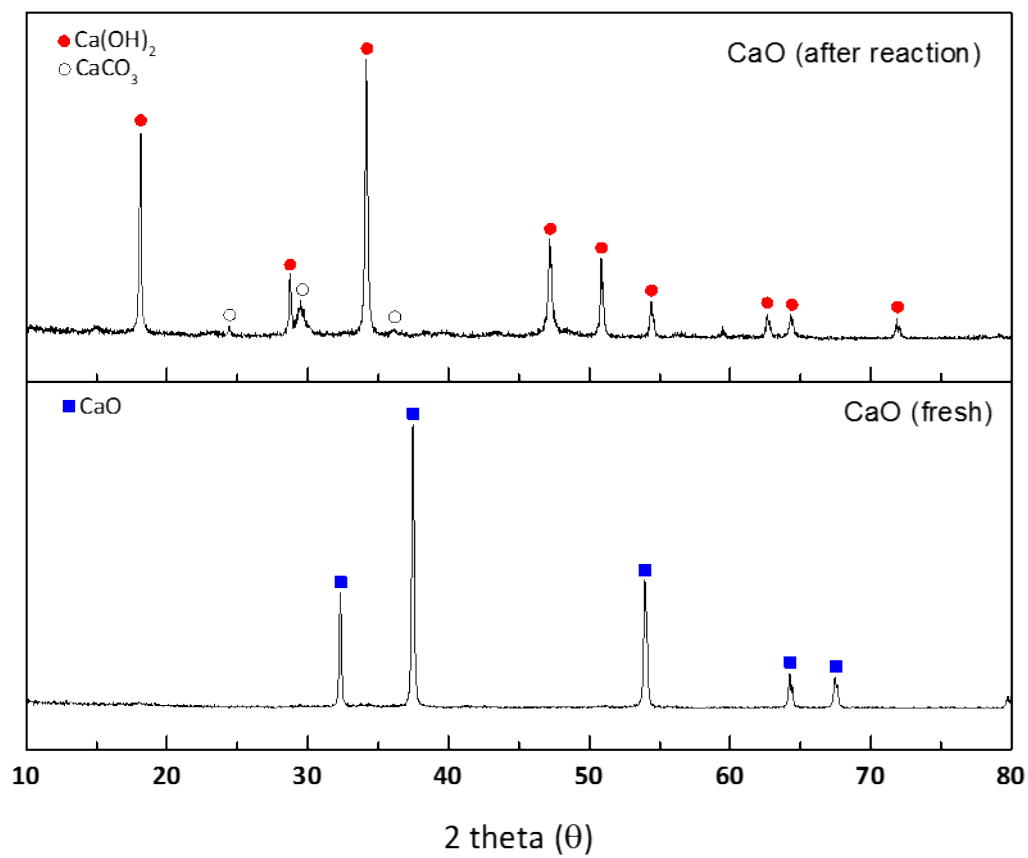


Fig. S3. XRD patterns of fresh and used catalysts.

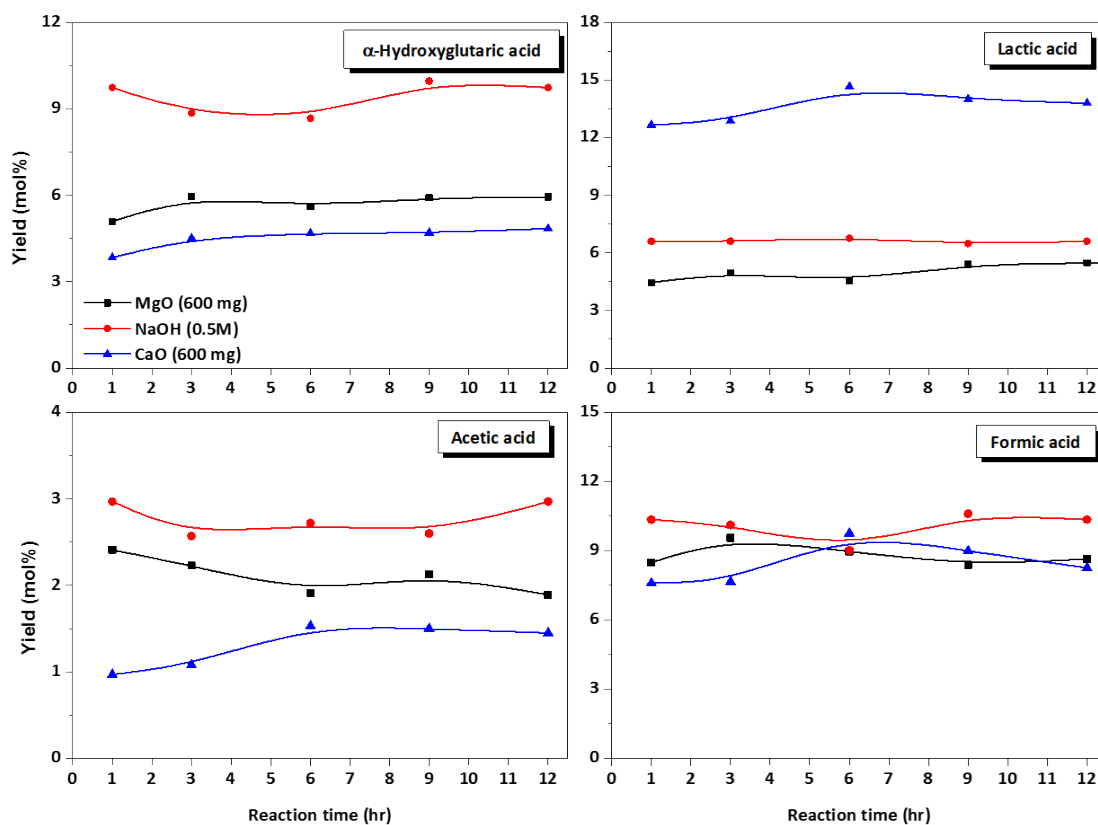


Fig. S4. Comparison of catalytic activity between heterogeneous and homogeneous base catalysts by reaction times. Reaction conditions: sodium alginate=600 mg, solvent (water)=30 mL, reaction temperature=200 °C, stirring speed=600 rpm.

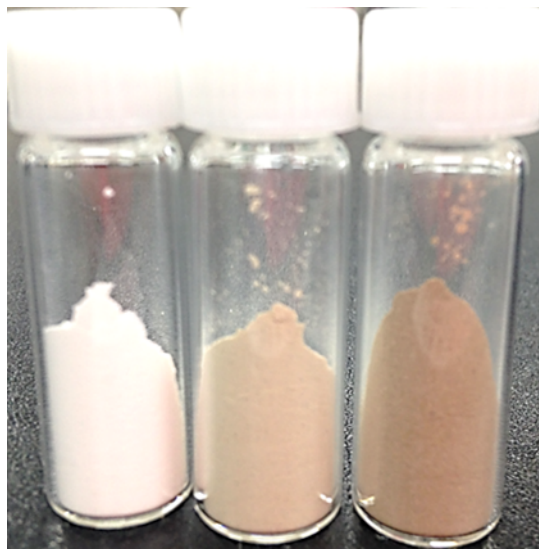


Fig. S5. Color variation of CaO catalyst by repeated hydrothermal reactions. Fresh CaO (left), used CaO (middle), deactivated CaO (right).

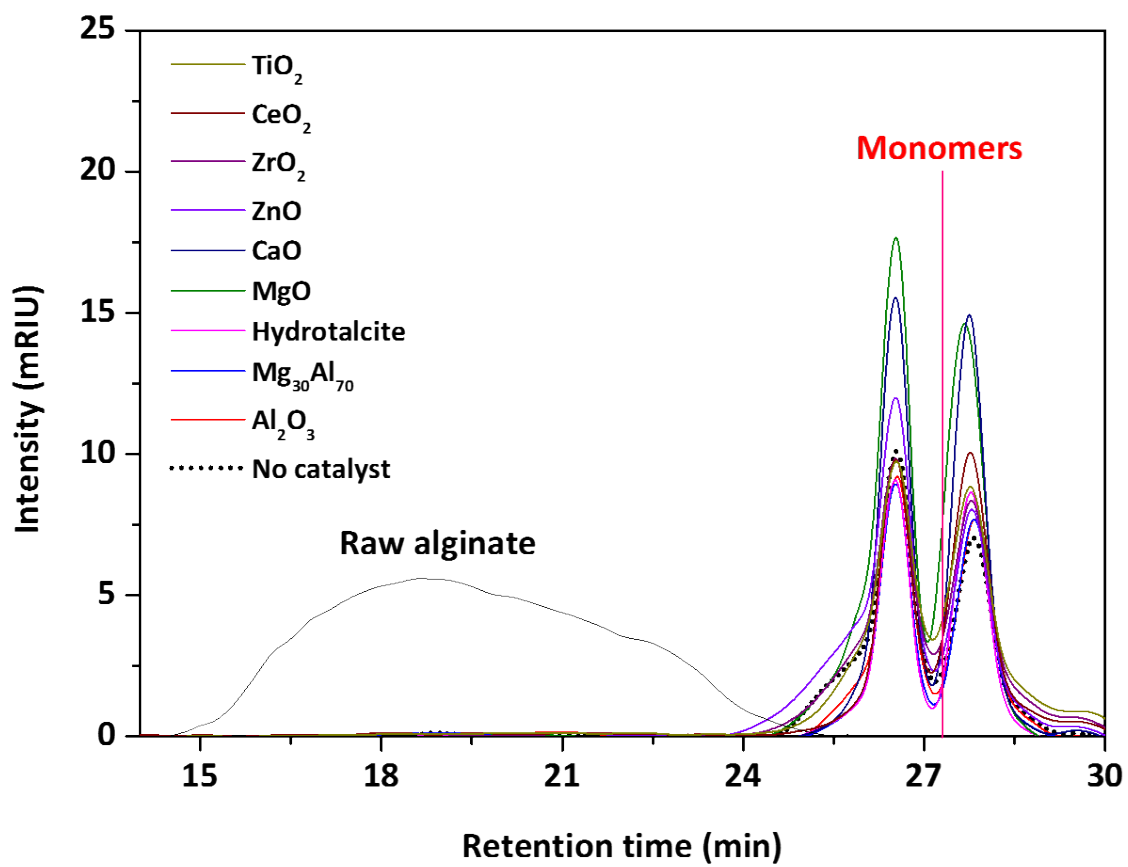


Fig. S6. GPC chromatograms of raw alginate and hydrothermally treated alginate over various solid base catalysts at 200 °C for 1 h.

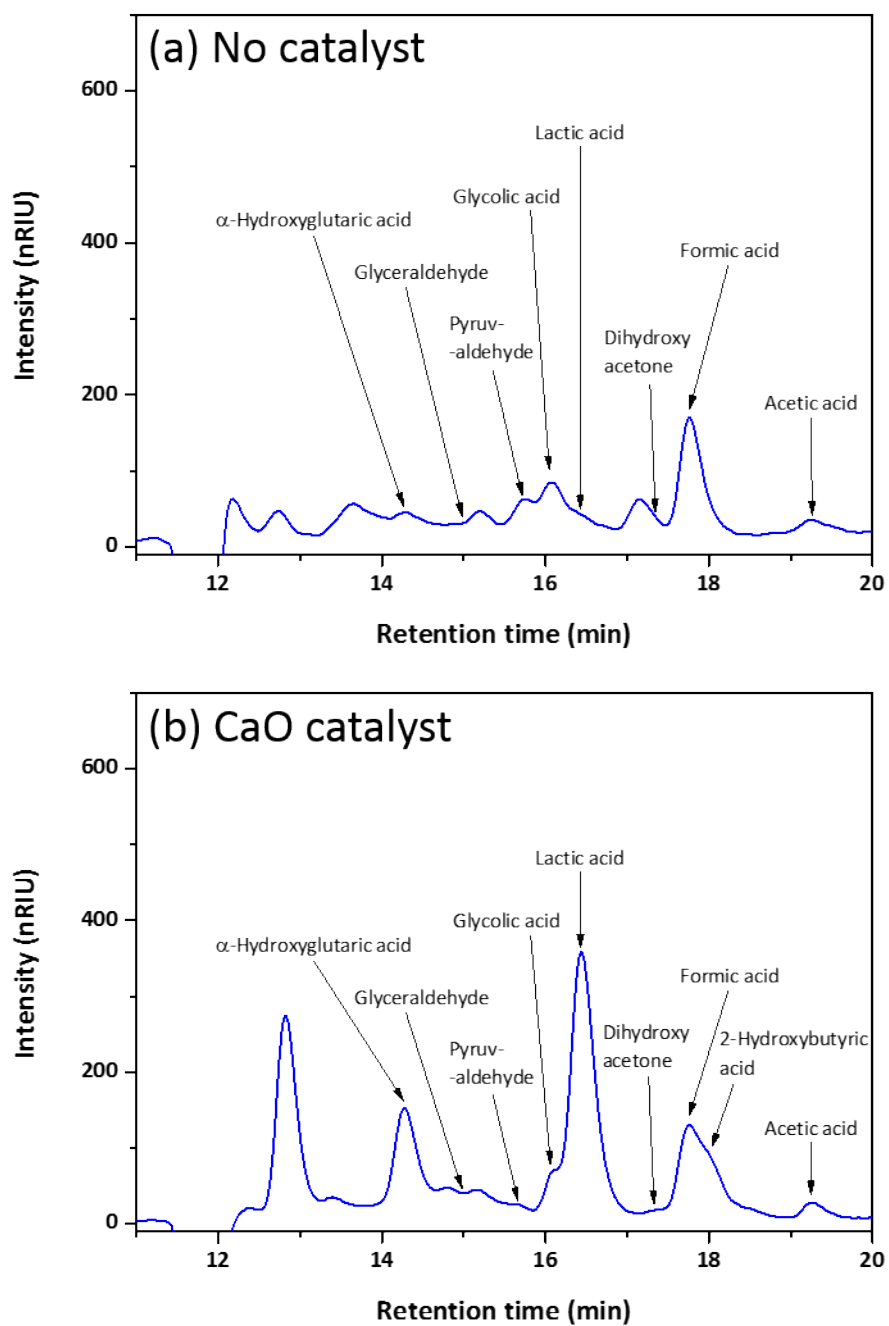


Fig. S7. HPLC-RID chromatogram for hydrothermal decomposition of alginate at 200 °C for 1 h. (a) Reaction without catalyst; (b) Reaction over CaO catalyst (600 mg).