Supplementary Information

Steam-assisted electro-reduction of NiO: A sustainable alternative to conventional hydrogen reduction

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Fig. S1 (a) Schematic illustration and (b) the photograph of the setup used to evaluate the wettability of molten salt with graphite.
Fig. S2. The cross-section of electrolytic product under constant voltage of 1 V for 6h in LiCl melt.
Fig. S3. The current, cathode and anode potential differences recorded during the constant voltage electrolysis under 1 V using pellet and powdery cathode, respectively.
Fig. S4. SEM images of electrolytic products under 1.2 V (upper-left) and 1.3 V (upper-right) in LiCl melt for 8h., and EDS spectrum from the marked area in upper-left image.
Fig. S5. (a-c) XPS spectra of NiO pellet before electrolysis and Ni product after electrolysis at 1.4 V in molten LiCl at 670 °C: (a) XPS survey spectra; (b) high resolution Ni 2p, and (c) O 1s. (d) FTIR spectra of Ni products electrolyzed at 1.4 V in various electrolyte compositions.
Fig. S6. The concentration of hydrogen–time curve via potentiostatic electrolysis of NiO pellet under 1.4 V in LiCl melt under moisturized atmosphere.
Fig. S7. (a) Current-time profiles under 1.4 V potentiostatic electrolysis in LiCl-58.5 wt.% CaCl₂ eutectic system at processing temperature of 570 °C under moisturized atmosphere. (b) The corresponding cathodic and anodic potential differences recorded during electrolysis.