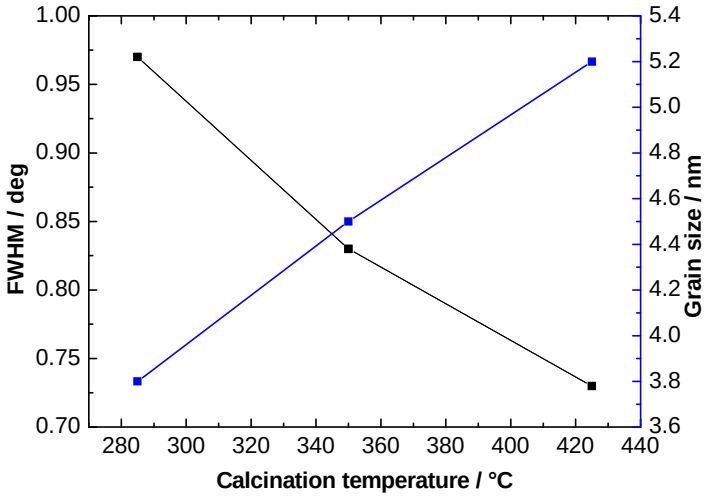
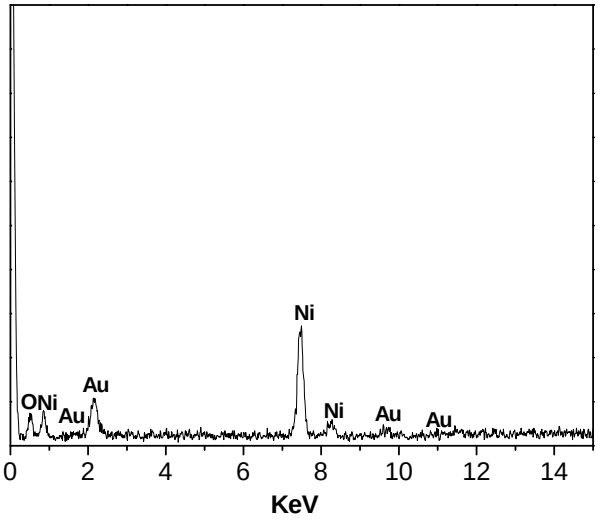
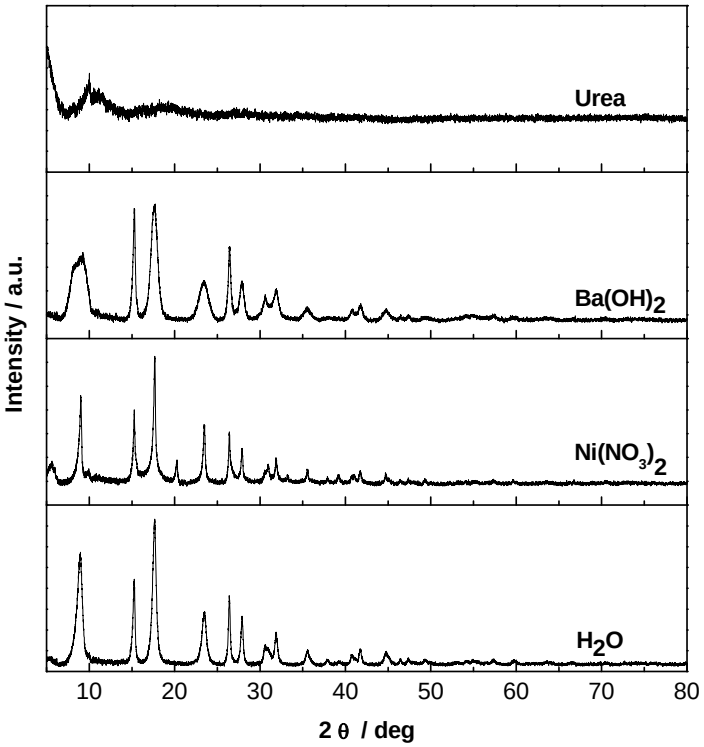
Supporting Information



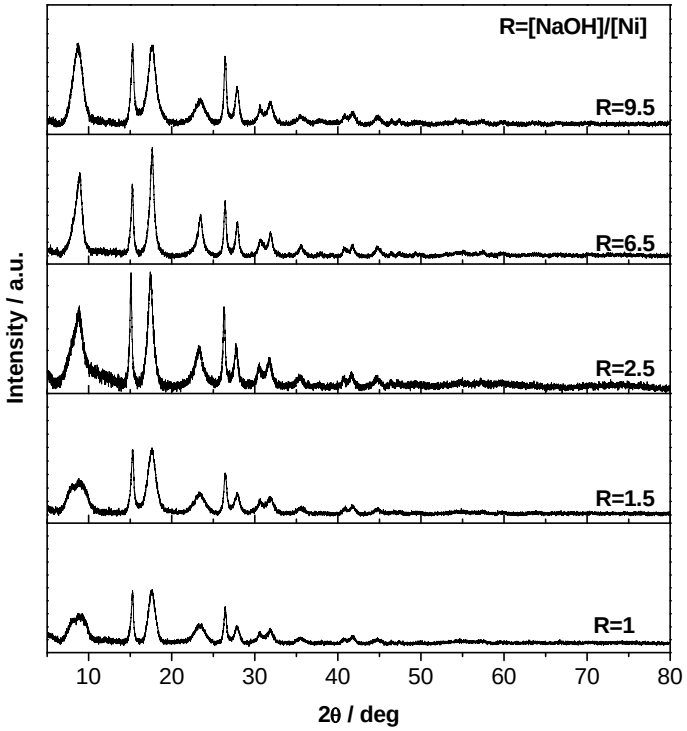
SI-1. (200) peak width and grain size of NiO powders vs. the calcination temperature.



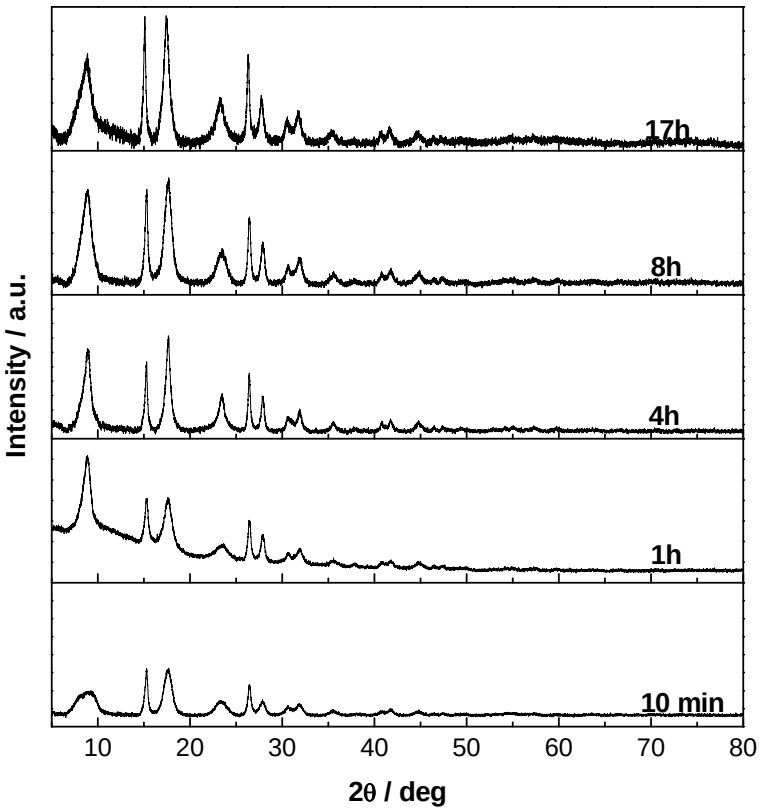
SI-2. EDX spectrum of sonochemically prepared $Ni(OH)_2$.

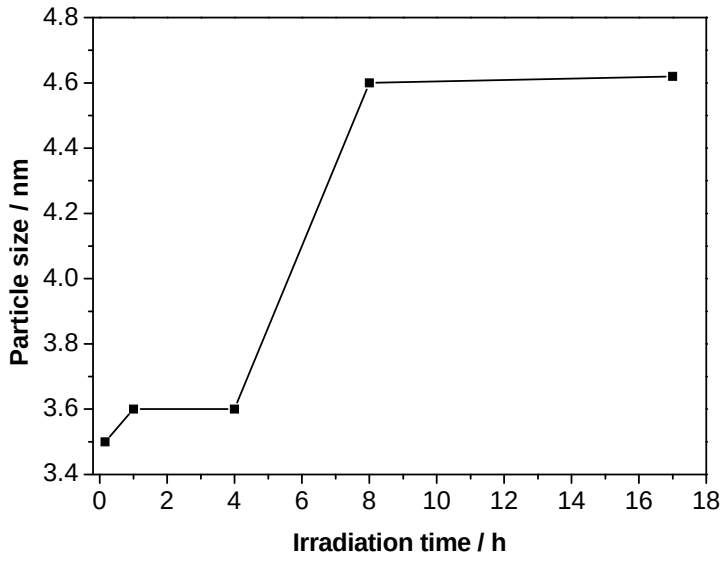


SI-3. XRD patterns of $Ni(OH)_2$, prepared via sonochemical synthesis under different conditions: With urea and $Ba(OH)_2$ as precipitators, $Ni(NO_3)_2$ instead of $Ni(CH_3COO)_2{\cdot}4H_2O$ as the nickel source or with water instead of ionic liquid as the reaction medium.

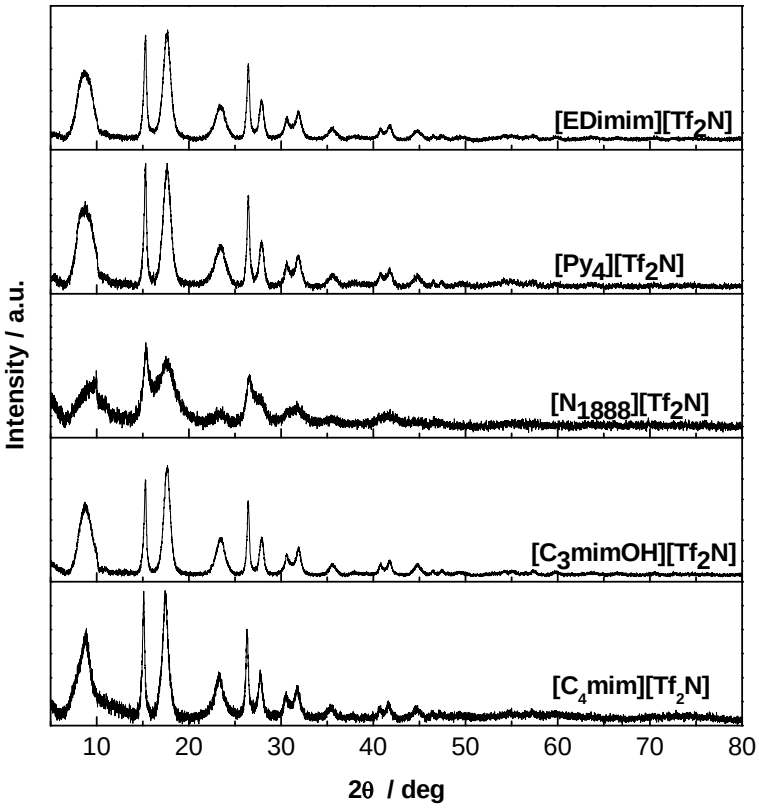


SI-4. XRD patterns of $Ni(OH)_2$ prepared in $[C_4mim][Tf_2N]$ via sonochemical synthesis with different $NaOH:Ni(CH_3COO)_2$ ratios.

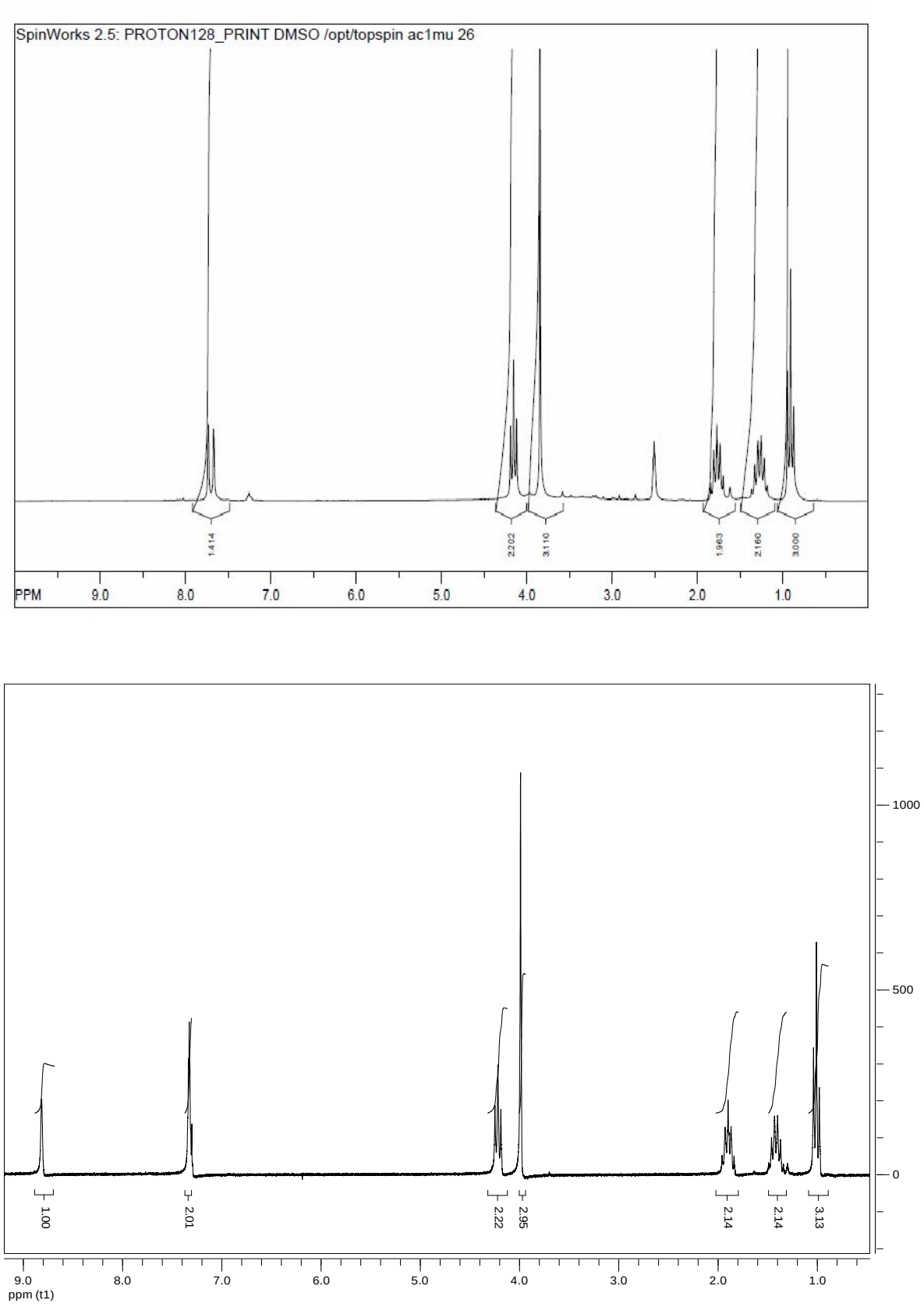




SI-5. XRD patterns of $Ni(OH)_2$ prepared in $[C_4mim][Tf_2N]$ via sonochemical synthesis using different reaction times.



SI-6. XRD patterns of $Ni(OH)_2$ prepared in ionic liquids with different cations via sonochemical synthesis.



SI-7. ^{1}H-NMR-spectrum of the final reaction solution when the ratio (0.8:7.5) of NaOH:Ni(CH_3COO)$_2$ was used to prepare Ni(OH)$_2$ in [C_4mim][Tf_2N] (top) compared to the ^{1}H-NMR-spectrum of pure [C_4mim][Tf_2N] (bottom).