

Supplementary Information

CO₂ sequestration in ultramafic ore: Impact on the efficiency of nickel beneficiation

Shaihroz Khan^{a,b*}, Mohammad Shoaib^c, Lindsey K. Fiddes^d, Omar Bashir Wani^{a,e}, Erin Rae Bobicki^{a,e*}

^aDepartment of Chemical Engineering and Applied Chemistry, University of Toronto (UofT), 200 College Street, Toronto, Ontario, M5S 3E5, Canada

^bBASF SE APR Division, Carl Bosch Strasse 38, Ludwigshafen, Rhineland-Palatinate, 67063, Germany

^cEarth and Environmental Sciences, Lawrence Berkeley National Laboratory, 1 Cyclotron Road, Berkeley, California, 94720, United States

^dMicroscopy Imaging Lab, Temerty Faculty of Medicine, University of Toronto (UofT), 1 King's College Circle, Medical Sciences Building, Toronto, Ontario, M5S 1A8, Canada

^eDepartment of Chemical and Materials Engineering, University of Alberta, Donadeo Innovation Centre for Engineering, 9211-116 Street NW, Edmonton, Alberta, T6G 1H9, Canada

* Corresponding Authors

Corresponding Authors E-mail:

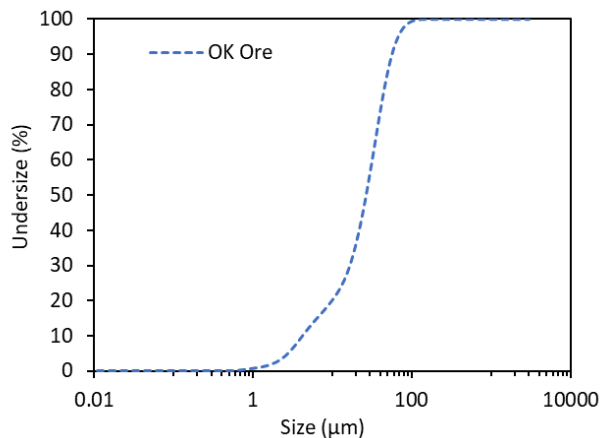
shaihroz.khan@utoronto.ca

erin.bobicki@utoronto.ca

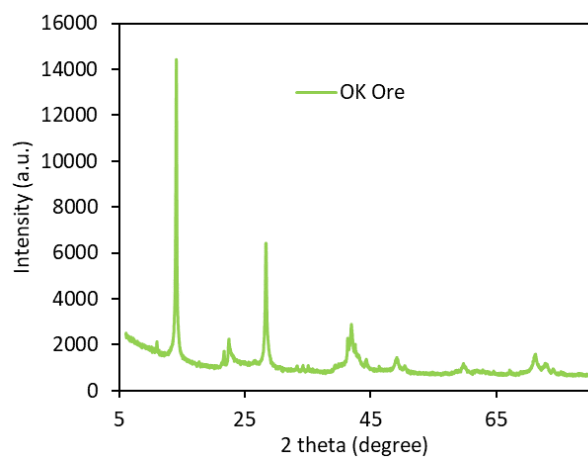
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Supplementary Figure 1: Particle Size Distribution of OK Ore.



Supplementary Figure 2: X-Ray Diffraction pattern of OK Ore.

CO₂ Uptake/ tonne Ni Calculations:

The amount of CO₂ captured (g)/100 g of ore was mentioned in the graphs. Now with the ore containing 0.22% Ni as per the ICP analysis, the amount of CO₂ captured per tonne of Ni would be,

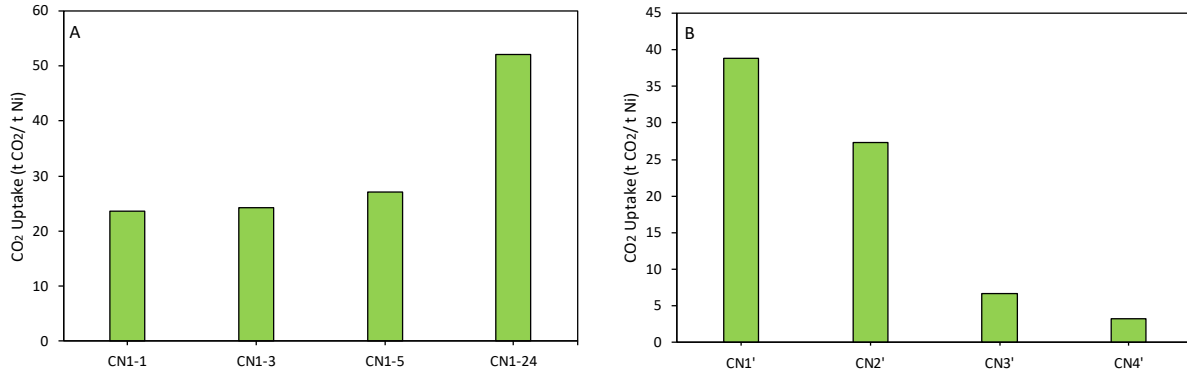
- a. The CO₂ uptake per 100 g of ore (sample CN1-1, Fig 1a).
 $U_{\text{ore}} = 5.19 \text{ g}/100\text{g ore}$
- b. The amount of nickel in 100 g of ore.
 $0.22\% \text{ of } 100 \text{ g} = 0.22/100 \times 100 \text{ g} = 0.22 \text{ g of Ni.}$
- c. The CO₂ uptake per gram of nickel in 100 g of ore.
 $U_{\text{Ni}} = 0.22 U_{\text{ore}} = 5.19/0.22 = 23.59 \text{ g CO}_2/\text{g Ni}$

d. Calculate the CO₂ uptake per tonne of nickel.

$$U_{\text{Ni,tonne}} = U_{\text{Ni}} \times 1,000,000 = 23.59 \times 1,000,000 = 23,590,000 \text{ g CO}_2/\text{ tonne Ni}$$

$$= 23.59 \text{ tonnes/ tonne Ni}$$

Similarly, the CO₂ uptake/ tonne Ni is calculated for other samples (Supplementary Fig. 3 a & b).



Supplementary Figure 3: CO₂ uptake/ tonne Ni for samples in Fig. 1 a (A) & b (B).

Characterization of samples for carbonate formation: The results from TIC (Fig. 1 a & b) showed 15.87% conversion for CN1' and 21.29% conversion for CN1. The results from both the XRD (Table S1) and TIC are very close to each other, and it indicates the consistency of results across two different characterization techniques.

Table S1: Semi-quantitative % Mineral Compositions - Rietveld Refinement

Sample Description/Minerals identified by XRD	Semi-quantitative % mineral compositions
CN1'	
Clinochlore	41.51
Lizardite	35.82
Magnesite	14.04
Talc	6.45
Magnetite	2.19
CN1	
Clinochlore	38.25
Lizardite	33.39
Magnesite	20.65
Talc	4.84
Magnetite	2.86