

Materials List for:

# Two-way Valorization of Blast Furnace Slag: Synthesis of Precipitated Calcium Carbonate and Zeolitic Heavy Metal Adsorbent

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## Materials

Name	Company	Catalog Number	Comments
Acetic acid (CH <sub>3</sub> COOH)	Caledon Laboratories	1000-1-29	Glacial (≥99.7%).
Autoclave reactor	Parr	4525-T-HC-M(HC)	One liter volume, equipped with dual turbine impeller, baffle and electric heating jacket.
Blast Furnace (BF) slag	ArcelorMittal	-	Granulated BF Slag from Ghent (Belgium); Pelletized BF Slag from Hamilton (Canada).
Carbon dioxide (CO <sub>2</sub> )	Praxair	TBC	Industrial grade (99.5%).
Centrifugal Mill	Retsch	ZM100	0.50 mm sieve.
Centrifuge	Thermo Electron	IEC CL30	To separate solids from liquids.
Ecoclave reactor	Büchi	Type 3E	One liter volume, equipped with turbine impeller, baffle and electric heating jacket.
Filter paper	Fisher Scientific	P8 (09-795F)	Porosity: coarse; flow rate: fast.
Hydrochloric acid (HCl)	Caledon Laboratories	6025-1-29	Reagent grade (36.5%-38.0%).
Incubator	New Brunswick Scientific	I 24	Orbital shaker with temperature control.
Inductively Coupled Plasma Mass Spectrometer (ICP-MS)	Thermo Electron	X Series	To determine the concentration of Al, Ca, Mg and Si in the post-extraction leachates and post-carbonation liquid medium.
Inductively Coupled Plasma Optical Emissions Spectrometer (ICP-OES)	PerkinElmer	Optima 8300	To determine the concentration of Ni in the post-centrifuged equilibrated adsorbent-adsorbated leachate.
Laser Diffraction Analysis (LDA)	Malvern	Mastersizer 3000	To measure the average particle size diameter and particle size distribution (PSD) of the solids.
Microbalance	Sartorius	Quintix224-S1	Four decimals.
Ni standard solution	Perkin Elmer	N9300136	Concentration of 1,000 mg/1,000 mL.
Nitric acid (HNO <sub>3</sub> )	Caledon Laboratories	7525-1-29	Reagent grade (68.0%-70.0%).
Oven	Fisher Scientific	Isotemp oven	105°C.
pH meter	Fisher Scientific	AB15	Calibrated with standard solutions before each set of measurements; temperature corrected to 25 °C.
Sodium hydroxide (NaOH)	Caledon Laboratories	7871-6-42	Reagent grade (50% W/W).

X-ray Diffraction (XRD)	Rigaku	MiniFlex 600	To characterize mineralogical properties of adsorbant solids.
X-ray Fluorescence (XRF)	PANalytical	Zetium	To characterize chemical composition of solids.
Nitrogen Adsorption	Quantachrome	NOVAtouch	To characterize specific surface area, pore volume and mean pore diameter of solids.