Perolehan litium dari lumpur bledug kuwu dengan metode presipitasi kimia bertingkat dan penukar kation lewatit S-108 = Lithium recovery of bledug kuwus clays with leveled chemistry precipitation method and lewatit S-108 cation exchange / Miftakhur Rohmah

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Abstrak

ABSTRAK
Lumpur Bledug Kuwu mengandung 0,0029 Li dalam bentuk fasa Li-Montmorillonit sehingga berpotensi sebagai deposit litium di Indonesia. Li-Montmorillonit dilindih menggunakan media akuades pada variasi rasio padatan/cairan 1/2, 1/5, 1/10 , temperatur 25oC, 30 oC, 35 oC, dan 45 oC , selama 2,3,4,dan 5 jam. Kondisi optimal adalah kondisi dengan kadar Li tertinggi dan rasio impuritas paling rendah, yaitu pada temperatur ruang selama 3 jam , rasio S/L = . Brine mengandung 15,11 ppm Li dengan rasio kadar Na/Li = 80,74 ; K/Li = 11,91 ; Ca/Li = 4,77 ; Mg/Li = 1,97. Semakin kecil rasio S/L maka perolehan kadar litium semakin kecil hingga 3,09 ppm dengan persen perolehan 92,71 . Semakin tinggi temperatur hingga 45oC maka perolehan litium semakin kecil hingga 9,29 ppm dengan persen perolehan 46,75 . Perolehan kadar litium meningkat seiring waktu pelindian namun mencapai maksimum setelah 3 jam dan kemudian menurun hingga 12,47 ppm dengan persen perolehan sebesar 69,67 . Hasil Uji XRD dan SEM mengonfirmasi bahwa Li-Montmorillonit telah berhasil dilarutkan dengan akuades pada semua kondisi pelindian. Selanjutnya, brine digunakan sebagai bahan baku pada tahap penguarangan kadar Mg dengan reagen batu kapur CaO . Penghilangan ion Mg dan Ca pada konsentrat menggunakan prinsip presipitasi kimia berdasarkan nilai kelarutan senyawa. Tahapan ini menghilangkan Mg hingga kadar akhir 0,02 ndash; 0,1 ppm. Semakin banyak jumlah CaO yang ditambahkan, semakin kecil kadar Mg dan B, namun kadar Li, Ca, dan K cenderung meningkat. Endapan dikonfirmasi oleh SEM-EDX dan XRD sebagai MgO. Kondisi optimal pada penambahan CaO sebesar 0,1875 gram ke dalam 100 ml brine. Reagen asam oksalat digunakan untuk membentuk presipitat Ca-Oksalat dengan adanya ion C2O42-. Namun, adanya ion HC2O4- dan H dapat meningkatkan kelarutan Ca-oksalat dalam larutan, sehingga kadar Ca semakin meningkat seiring penambahan asam oksalat. Reagen oksalat tidak stabil terhadap Li. Semakin banyak massa oksalat, litium mulai mengendap sebagai litium hidrogen oksalat hingga kadar Li berkurang menjadi 3,7119 ppm. Konsentrat 2 selanjutnya sebagai inluen pada proses pertukaran kation. Resin Lewatit S-108 dengan gugus aktif sulfonat hanya mampu mengadsorpsi fisika ion Li dan K, serta adsorpsi elektrostatik ion exchange ion Ca dalam kandungan inluen yang divariasikan pH 4, 6, dan 12 dan laju alir 50ml/0,5jam ; 50ml/1jam ;dan 50ml/2jam . Jumlah adsorpsi ion Li sebesar 0,0030 ndash; 0,0032 mmol/g, adsorpsi ion K sebesar 0,0027 ndash; 0,0028 mmol/g, adsorpsi ion Ca2 sebesar 0,0001 ndash; 0,0002 mmol/g, dan adsorpsi Na bernilai negatif. Semakin cepat laju alir, semakin tinggi juga efisiensi perolehan Li, Ca, dan K. Semakin tinggi pH mendekati basa , jumlah dan kapasitas maksimum adsorpsi Li, Ca, dan K.
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ABSTRACT
The Bledug Kuwu rsquo s Mud contained 0,0029 Li in Li Montmorillonite phase form so that it could potentially be a lithium deposit in Indonesia. Li Montmorillonite was leached using water with variation of

solid liquid ratio 1 2, 1 5, 1 10 , temperature 25oC, 30 oC, 35 oC, dan 45 oC , for 2, 3, 4, and 5 hour. The optimum leaching process was the condition that yield the highest Li content with the lowest impurity ratio. Water leaching at ambient temperature for 3 hours with the S L ratio of is the best condition. Brine contained 15,1086 ppm Li with content ratio of Na Li 80,74 K Li 11,91 Ca Li 4,77 Mg Li 1,97. The smaller the ratio of S L, the acquisition rate of lithium was the smaller until 3,0902 ppm with 92,71 of recovery. The increasing of temperature up to 45oC, the yield of litium was decreased until 9,29 ppm with 46,75 of recovery. The XRD and SEM results confirmed that Li Montmorillonite has been succesfully dissolved with aquadest under all condition of leaching process. Furthermore, Brine was used as a Raw Material at the removal stage of Mg content with a reagent of limestone solid CaO . The removal of Mg and Ca for concentrate used the principle of chemical precipitation based on the solubility of the compound. This reagent could remove Mg with an initial content of 29,76 ppm to concentrate with a final content of 0,02 ndash 0,1 ppm. The more CaO levels were added, the more Mg and B levels would decrease. While, the levels of Li, Ca, and K tend to increase. The phase of precipitate was confirmed by SEM EDX test as a cubic shaped MgO. The optimum condition concentrate 1 was obtained by adding CaO of 0,1875 gram into 100 ml Brine, so that final composition of lithium was 14,73 ppm. Oxalic acid reagents were used to form precipitates of Ca oxalate in the presence of C2O42 ions during ionization. However, the presence of HC2O4 and H ions could increase the solubility of Ca oxalate in solution, so that Ca content increased with the addition of oxalic acid. The oxalate reagent was unstable against the Li content, the more oxalate mass 4,7 grams added , the lithium began to settle as lithium hydrogen oxalate until the concentration of Li at Concentrate 2 decreases to 3,71 ppm. Concentrate 2 as an inluent in cation exchange process. Lewatit S 108 resin with sulfonate active group was only capable of adsorbing the physics of Li and K ions, as well as electrostatic adsorption ion exchange Ca ions in inluent content that varied on pH 4, 6, and 12 and flow rate 50ml 0,5hour 50ml 1hour and 50ml 2hour . The amount of Li ion adsorption is 0,003 0,0032 mmol g, adsorption of K ion 0,00274 ndash 0,00284 mmol g, Ca2 ion adsorption 0,0001 ndash 0,00022 mmol g, and Na adsorption is negative. The faster the flow rate, the higher the percentage recovery of Li, Ca, and K. While, the higher the pH near base , the maximum amount and the adsorption capacity of Li, Ca, and K.