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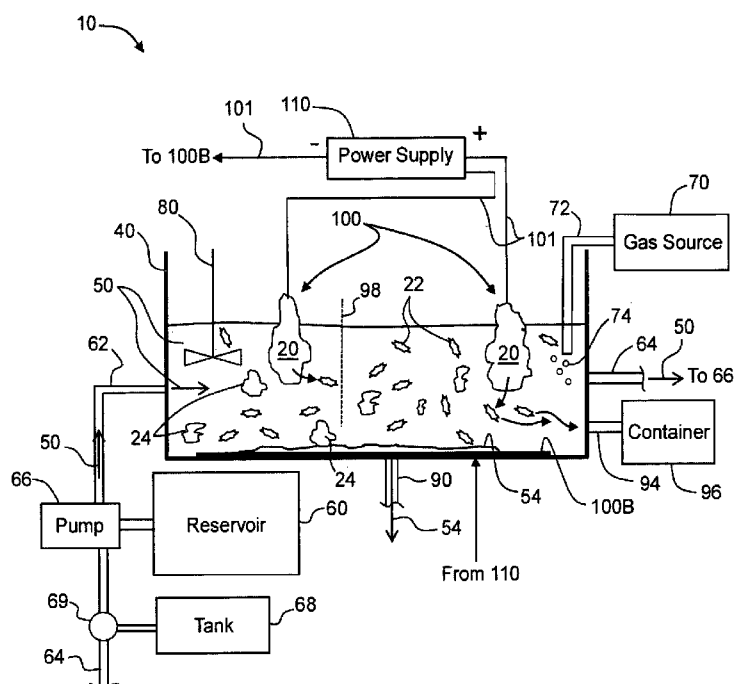


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 61/570,330 14 December 2011 (14.12.2011) US</p> <p>(71) Applicant: NATIONAL UNIVERSITY OF SINGAPORE [SG/SG]; 21 Lower Kent Ridge Road, Singapore 119077 (SG).</p> <p>(72) Inventors: LOH, Kian Ping; c/o National University of Singapore, Faculty of Science, Department of Chemistry, 21 Lower Kent Ridge Road, Singapore 119077 (SG). WANG, Junzhong; c/o National University of Singapore, NUS Nanoscience and Nanotechnology Initiative, 21 Lower Kent Ridge Road, Singapore 119077 (SG). CHIU, Gordon; PO Box 616, Summit, New Jersey 07902-0616 (US).</p> | <p>(74) Agent: AMICA LAW LLC; 30 Raffles Place, #18/03-04 Chevron House, Singapore 048622 (SG).</p> <p>(81) Designated States (<i>unless otherwise indicated, for every kind of national protection available</i>): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.</p> <p>(84) Designated States (<i>unless otherwise indicated, for every kind of regional protection available</i>): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).</p> |
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- (54) Title:** PROCESS FOR FORMING EXPANDED HEXAGONAL LAYERED MINERALS AND DERIVATIVES USING ELECTROCHEMICAL CHARGING



(57) Abstract: Processes for forming expanded hexagonal layered minerals (HLMs) and derivatives thereof using electrochemical charging are disclosed. The process includes employing HLM rocks (20) as electrodes (100) immersed in an electrolytic slurry (50) that includes an organic solvent, metal ions and expanded HLM (24). The electrolysis introduces organic solvent and ions from the metal salt from the slurry into the interlayer spacings that separate the atomic interlayers of the HLM rock, thereby forming 1st-stage charged HLM that exfoliates from the HLM rock. The process includes expanding the electrochemically 1st-stage charged HLM by applying an expanding force.



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