

Norwegian anorthosite as possible source for Al – a review

Presentation at Hydromet seminar 7th March, 2017 By Dag Øistein Eriksen



Short historic overview of anorthosite (An) in Norway

- V.M. Goldschmidt was the first to acknowledge the possibility of using An as source for Al or alumina (Al₂O₃) in 1917 – 100 years ago!
- AS Elektrokjemisk (now Elkem) carried out regional survey until 1920 of the Sogn area for An.
- During WWI a mine was established at Kinsedal in Luster by Norsk Hydro to serve their new Al-producing plant at Høyanger.
 - The mine was closed during the economic depression after the war.
 - In 1940 it was reopened to serve Al-production at Herøya, Porsgrunn. After Herøya was bombed in 1944 the mine was closed and never reopened.
 - The process Norsk Hydro used is not known, but nitric acid was probably used to dissolve An.
- In the mid 1960s a mine producing white rock was established in Nærøydal (Gudvangen Stein AS).









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Uı	nited S	tates Patent [19]			[11]	4,110,399	
Gau	dernack	et al.			[45]	Aug. 29, 1978	
[54]	PROCESS ALUMINA ALUMINU	FOR THE EXTRACTION OF FROM M-CONTAINING SILICATES	3,240,562 3,320,032 3,323,865	3/1966 5/1967 6/1967	Brown et al. Feller Michener et a		
[75]	Inventors:	Bjorn Gaudernack; Norvald Gjelsvik, both of Oslo; Leif Farbu, Strommen, all of Norway	3,586,481 3,620,671 3,816,590	6/1971 11/1971 6/1974	Hyde et al Maurel et al. Huska et al.	423/112 423/112 423/128 423/128 423/112	
[73]	Assignee: Institutt for Atomenergi, Kjeller, Norway		5,862,293 1/1975 Maurel et al 423/126 FOREIGN PATENT DOCUMENTS				
[21]	Appl. No.:	782,826	1,558,347	2/1969	France		
[22]	Filed:	Mar. 30, 1977	1,554,580				
[30]	[30] Foreign Application Priority Data		Attorney, Agent, or Firm—Eyre, Mann, Lucas & Just				
A	or. 2, 1976 [N	O] Norway 761136	[57]		ABSTRACT		
[51] Int. Cl. ² C01F 7/22; C01F 7/26 [52] U.S. Cl. 423/112; 423/126; 423/128; 423/132; 423/139; [58] Field of Search 423/12, 126, 139, 132, 423/128; 423/128; 423/139;			A process for the extraction of alumina from aluminum- containing silicates is disclosed. The process comprises acid leaching of the raw material, iron extraction, pre- cipitation of the aluminum fraction as the aluminum				
[56] References Cited			chloride hexahydrate, removal of sodium chloride and calcination to alumina. The process can be made contin-				
	U.S. I	ATENT DOCUMENTS	uous with substantial regeneration and recycling of				







- The process was demanding in the choice of materials. Graphite was used to withstand HClgas at high temperatures.
- The process was almost decided to be build, but would probably have been an economical disaster.
- The R&D work represented a significant build up of Norwegian hydrometallurgical competence. Institutions involved were IFE, SINTEF, UiO and NTH (now NTNU).



















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NOI	RGE	(51) Int Cl. <i>C01F 7/2</i> . <i>C01F 7/1</i> . <i>C01F 11/1</i> <i>C22B 3/0</i> . <i>C22B 3/2</i> . <i>C22B 3/3</i> .	4 (2006.01) 8 (2006.01) 8 (2006.01) 6 (2006.01) 6 (2006.01) 8 (2006.01)		
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Thanks to Nordic Mining for providing data Thanks to IFE

Thank you for your attention!

Be a part of the solution, not the residue!