PERICLASE AN IMPORTANT INDUSTRIAL MINERAL FOR REFRACTORIES

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Magnesite named after its chemical composition respectively according to the Greek landscape magnesia has been named by Dietrich Ludwig Gustav Karsten in 1808 (RÖSLER, 1983). The discovery of magnesite deposits in Austria led to intensive industrial use and today magnesia based refractories are indispensable materials. By heat treatment magnesite and synthetic brucite can be transformed to periclase which is also called magnesia. Before the use of magnesia beneath alumina-silica products natural rocks like dunites and serpentinites have directly been used for various applications.
Refractory materials can be classified as coarse ceramic materials consisting of refractory aggregates in different grain sizes which are bound together and pores. They are designed to protect people and equipment in order to enable high temperature processes.
The world production of all magnesia grades (caustic-, sintered- and fused magnesia) is estimated to have totalled 13Mt in 2012. In Austria approximately 870 000t magnesite have been mined in 2012 (ROSKILL REPORT, 2013). From this by far the main portion has been used to produce refractories. During use refractories undergo significant changes which lead to modified properties and finally wear of the materials. Improvements can be achieved by careful consideration of the mineralogical and chemical composition as well as the physical constitution (crystal size, porosity of grains) of the materials. This also has some implications with respect to raw material selection for magnesia production. One important issue is the combination of magnesia and other oxides which in certain amounts or ratios result in materials showing unique thermal and physical properties. Due to the various and unique properties of the natural resources and complex process steps still there is need to gain knowledge which gives rise for further research activities.

RÖSLER, H. J. (1983): Lehrbuch der Mineralogie, VEB Deutscher Verlag für Grundstoffindustrie, Leipzig.
ROSKILL REPORT (2013): Magnesium Compounds and Chemicals: Global Industry Markets and Outlook, Roskill information services Ltd., ISBN 978 0 86214 597 2, twelfth edition