

Talc:

Student Name

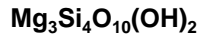
Abstract

Talc is a phyllosilicate mineral known for having a hardness of one. It is a monoclinic mineral and occurs as a hydrothermal alteration of magnesium silicates that lack aluminum. Talc can occur in many different colors but is commonly light green or white and often has a greasy, "soapy" texture to it, giving it the common name soapstone. It forms closely with pyrophyllite and is often associated with asbestos minerals. Talc is an important industrial mineral that is mined using open-pit mining techniques in the United States. Talc consumed in the U.S. is used for ceramics, paint, paper, cosmetics, as well as other industrial uses.

Introduction

Talc is a mineral silicate mineral that forms through hydrothermal alteration. It is mined throughout the world, with America being the second largest producer. Talc is used in many different everyday products because its physical and chemical properties make it desirable for many different uses.

Talc



Crystal: Monoclinic

Pt. Group: 2/m

Habit: Platy, Fine-grained, Massive

SG: 2.75

H: 1

L: Vitreous, Pearly

Optics: Biaxial (-)

Col: Pale Green, White, Gray White

Str: White

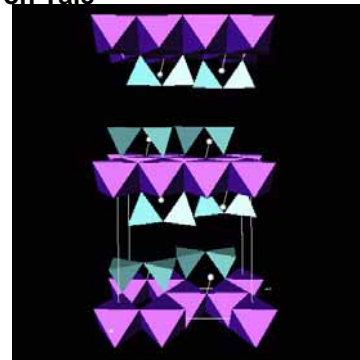
Clv: {001} Perfect

Name Derivation: From the Arabic "talq" meaning pure



General Information on Talc

- Known for being the softest mineral on Moh's Hardness Scale
- Can also have a trigonal crystal system
- A Phyllosilicate with a 2:1 ratio
- Can form through replacement of dolomitic marble by way of magnesium and silica rich hydrothermal water: $\text{CaMg}(\text{CO}_3)_2 + 4 \text{SiO}_2 + \text{H}_2\text{O} \rightarrow \text{Mg}_3\text{Si}_4\text{O}_{10}(\text{OH})_2 + 3\text{CO}_2 + \text{Ca}(\text{CO}_3)$
- Can form through hydrothermal alteration of mafic rocks in which magnesite reacts with silica and water to form talc: $\text{MgCO}_3 + 4\text{SiO}_2 + \text{H}_2\text{O} \rightarrow \text{Mg}_3\text{Si}_4\text{O}_{10}(\text{OH})_2 + 3\text{CO}_2$
- Associated with serpentine, dolomite, tremolite, calcite, chlorite, magnesite
- High-grade talc occurs at high temperature and pressure
- Darker versions can be weakly pleochroic

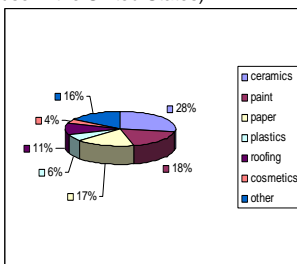


Crystal model of talc

Economics of Talc

Talc is used for many different purposes:

- Ceramics (main domestic use in the United States)
- Paint
- Paper
- Plastics (provides rigidity)
- Roofing
- Rubber
- Flooring
- Caulking
- Agricultural Applications



Products using talc

Other economic information:

- * Open-pit mining is mainly used in the mining of talc
- * China is the world's largest producer of talc, the U.S. is second
- * The Yellowstone mine is the largest talc producer in the U.S.
- * The Yellowstone mine produces roughly 27,000 metric tons of talc a year
- * There are 13 talc mines located in the United States
- * Amphibole minerals present in talc deposits have raised health concerns
- * Talc is useful because of its softness, chemical inertness, and purity
- * 11% of talc was imported into the U.S. in 2006
- * Production of talc is expected to stay the same in 2007 as in 2006

Conclusions

Talc is known for being the softest mineral on Moh's Hardness Scale, with a hardness of one. It is a phyllosilicate mineral with a 2:1 scale and has a monoclinic crystal system. It occurs in hydrothermally altered non-aluminous magnesium silicates or as an alteration of magnesium rich mafic rocks. Talc's crystal habit can range from foliated to massive to scaly. Talc often forms with serpentine and other asbestos minerals. Talc is mined in open-mining pits within the U.S., with Montana being the state with the biggest talc production. The mineral is used in a number of everyday items such as paints and rubbers and is used as a refractory product. Sales of products containing talc are rising, causing a higher demand for the mineral.

References

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