

# Chapter 1.

# Synthesis of Medicinal Aluminum-magnesium silicate

Aluminum-magnesium silicate (AMS) is a natural ore which occurs as mineral deposits in India and in the United States of America. It is an off-white or creamy white, odorless, tasteless, soft-slippery, small-flaky or fine powder. It has a density of 2.41 g/cm and a moisture content of 6.0 to 9.98% and is insoluble in water, alcohol and organic solvents. The complex compound is a polymeric complex of Aluminum, Magnesium, Silicon, Oxygen and Water. Its average chemical analysis is expressed as 13% Magnesium oxide, 61% Silicon oxide, 2% Calcium oxide, 0.1% Titanium oxide and 0.9% Feric oxide.

The complex is composed of three lattice layers of octahedral alumina and two tetrahedral silicate sheets. The Aluminum is often substituted to varying degrees by Magnesium, Potassium or Sodium to balance the electrical charges. Iron, Lithium, Calcium and Carbon could be present in smaller quantities. In the pharmaceutical industry, Aluminum-magnesium silicate is marketed as Vee-gum® or Pyropes®. Other synonyms for the pharmaceutical raw material include Aluminosilic acid, Carisob, Geisord, Magnabite, Magnesium-aluminum silicate etc.

Each molecule of the AMS is composed of submicroscopic platelets (0.96 nm thick). So, the molecules are made of *Nanoparticles*. *Nanoparticles* of AMS are stacked in sandwich fashion with a layer of water between each. Faces of the *Nanoparticles* have negative electrical charges, while their edges are positively charged. The net negative electrical charge of the platelets is balanced by Sodium and other cations.