11 Dec 2003

Asbestos is a unique natural material that is deemed to be irreplaceable in aluminum casting, yet unfortunately it is harmful in production and in utilization.

Industrial aluminum is produced at factories with the help of an asbestos thermosilicate; it is on the thermosilicate that the molten metal is poured. Researchers from the Mendeleev Russian Chemical and Technical University have proposed a new material for this process, made from ecologically friendly calcium hydrosilicate. A natural crystalline wollastonite in the form of fine crystal-needles is added to the hydrosilicate fibers. Then the mixture is fired and an asbestos replacement is obtained. Molten aluminum does not wet such a material, it is ecologically harmless and so has promise for application in the aluminum industry. What is more, it is well suited for use as a filler for plastics, varnishes and paints, and even for brake pads.

To create the new material a means had to

obtaining calcium hydrosilicate crystals. At the faculty of basic silicate technology, filamentous white crystalline fibres are obtained in a reactor with enhanced saturated water vapor pressure. A charge is mixed for the load into the reactor: industrial oxide or slack lime is taken and mixed with silicon dioxide, in the form of fine-milled quartz sand or amorphous natural silica. However, such industrial wastes as microsilica and even ash, obtained from burning rice straw (good for regions that grow rice), could be useful. Then the charge mix is boiled at about two hundred degrees until the required mineral composition is obtained. As a result the required light (the volume mass of the material is ten times lower than the mass of water), non-combustible material is obtained with high heat- and sound-insulating properties. Snow-white in color, it is very light, floats on water and it is ecologically completely harmless. From the filamentous crystals come wonderful insulating and sealing materials, materials for filtration of biological preparations, vaccines or sera. They can be used to defecate various liquids from

impurities, perform fine cleaning of solutions and even clean the surface of water from oil pollution.