K-6 Magnesium-based reflective thermal insulation coating composites

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ABASTRACT

Thermal insulation is regarded as the main solution to the energy loss of buildings. Traditional thermal insulation focuses on decreasing the thermal conductivity of the transmission medium, allowing less heat to be transferred. The most significant defect of the traditional thermal insulation is that it has no effects on the radiant heat transfer. The radiant heat, in terms of electromagnetic waves, will cause molecules to vibrate, increasing the temperature of the molecules. In reality, the radiant heat is the only way that the solar energy can reach and warm the earth. While most common building materials, including concrete and glass, have no effective reflectivity of electromagnetic waves which means that most radiant energy is absorbed and experienced in the forms of heat. So the traditional thermal insulation, generally, is a kind of passive thermal insulating method. New, initiative, highly efficient, easily processed and nontoxic thermal insulation materials will have deep impact on the traditional thermal insulation industry and market. To overcome the shortage of the traditional thermal insulation, the new innovative thermal insulation coating material has been developed, which can form a radiant barrier or electromagnetic reflectors on the surface of buildings. This new reflective coating has been developed according to the reflection theory and the multilayered structure formed after coating process. The merits of the new magnesium-based thermal insulation material includes: I) High efficiency in reflecting the visible wave and infrared range of sunlight; II) Environmental friendly as it is inorganic in nature and hence no VOC; III) Good resistant to high temperature and fire; IV) High resistance to UV radiation; V) Strong adhesive strength to substrate, and VI) More durable. In this talk, the formulation, properties and applications of the newly developed magnesium-based reflective thermal insulation coating composites will be introduced in details.