

Technology



Cool moves on building insulation



Li Zongjin

FOR THOUSANDS OF years there have been many attempts to block the transfer of heat into buildings. This has been done to create a more comfortable living and working environment.

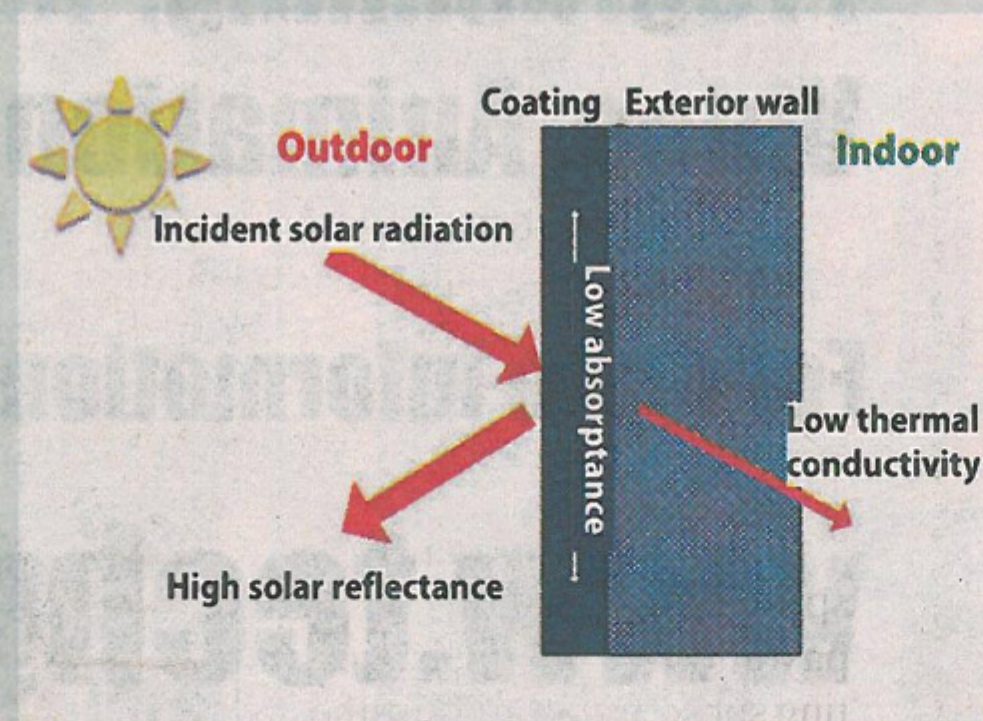
Energy use in buildings accounts for a large percentage of the total energy consumption of a place.

In Hong Kong, more than half of the total energy generated is consumed by buildings. With the rapid depletion of fossil fuels and the requirements of sustainable development, reducing energy consumption in buildings has become an important strategic issue.

In this regard, the development of good thermal insulation materials for buildings is a practical solution for effectively cutting energy consumption.

Conventionally, low thermal conductivity is considered the most important factor when selecting a material for insulation.

Traditional thermal insulation materials



commonly contain very high void content resulting in major drawbacks such as weak mechanical strength, low resistance to physical or chemical attacks and bad durability.

To avoid these drawbacks and provide good insulation, an advanced insulation system has been developed at the Hong Kong University of Science and Technology.

It includes a structural heat insulation wall panel and an innovative inorganic coating material, which we will discuss.

Solar electromagnetic radiation striking the Earth's atmosphere ranges from 100 nanometers to one millimeter. This can be divided as ultraviolet light, visible light and infrared light. Visible and infrared light comprise more than 90 percent of solar energy.

If energy contained in the visible light and infrared ranges can be blocked outside buildings, people will come to depend less on auxiliary cooling systems, such as air-conditioners, and this will result in saved energy.

The advanced thermal insulation coating was developed with a specifically designed multilayered structure (see illustration, left) to reflect radiant heat energy.

Therefore, with the multilayered structure the majority of visible light and infrared waves can be reflected from the surface of buildings. This special

coating material will also effectively block radiated heat. In addition, the developed coating is a combination of magnesium cement (a well-known material that preserves heat) and air-filled beads with low thermal conductivity, which can help further improve thermal insulation properties of the coating material.

With full support from the government's Innovation and Technology Fund and several companies, laboratory development, trial production and trial application of this developed coating has been recently completed.

Besides laboratory results demonstrating good thermal insulation property, Gammon Construction provided feedback of clear energy saving by comparing this coating material in their trial application. The marketing of this coating material is the next goal.

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