Abstract:

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The recent progress of urbanization has brought a host of urban environmental problems to the fore. The “heat-island” phenomenon is a typical example. “Heat island,” temperature in urban area is higher than nearby outlying suburbs, have been recognized since the 19th century. But with the abrupt advance of urbanization in recent years, the effect of this phenomenon has been increasing at an accelerated pace[1]. Based on de f nitions from the United Nations, populations in urban areas now account for about 50% of the world population overall[2]. We should think of the heat island phenomenon not merely as an urban environmental problem, but as an environmental problem of global scale.

A host of causes behind the heat-island phenomenon have been enumerated, such as changes of the earth’s surface materials, the intensive consumption of energy, and the intensive exhaust of heat, together with the effects of air pollution and the like. One of the main factors behind the temperature increase in urban centers is the replacement of green areas and bare areas with asphalt pavement and concrete structures. This change remarkably decreases the capacity of the cityscape to retain water, and it promotes the accumulation of heat in materials furnace process, an admixture used in cement and the like, is one of the main raw materials composing Road Cool.

shows the basic properties of Road Cool. Road Cool is available in two types: the high waterburied at a depth of 15 mm from the pavement surface.

shows the water-absorption behavior of the water-retentive materials obtained when the curing conditions were changed. In the Road Cool aged at 20°C, a layer of water of 20 cm in sample's height was completely suctioned in less than 4 hours. In the Road Cool aged at 60°C, the water was initially suctioned at the same speed and sufficient water absorption performance was maintained until the water suction upto a height of 20 cm was about 2 hours late. In contrast, the water-absorbing speed of the comparative material with the higher binder content substantially decreased after curing at 60°C, while the water-absorbing speed of the sample cured at room temperature was almost the same.

shows the change in the 24-hour water absorption when the curing time was changed. In Road Cool, the initial level of water absorption was maintained even after the material was cured with water at 60°C for 1 week. In the comparative material with a higher binder content, the level of water absorption sharply decreased as the curing time with water was extended.

These results suggest that the water-absorbing properties change as the curing conditions variation, and thus