Patent Search

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Abstract:

The present disclosure relates to heat-resilient buildings and thermal energy management systems, and provides a heat-resilient building (100) configured to prevent penetration into the building interior. The heat-resilient building (100) includes a metal oxide chemical block (102) integrated within a concrete wall structure (104) to absorbent layer (114), the metal oxide chemical block (102) incorporating a zinc oxide component (106) and a copper oxide component (108) consolidated by a NaOH binder (110). The heat-resilient building (100) is configured to absorb thermal energy from sunlight falling on the building envelope and to route captured energy thro battery storage unit (116) for secondary applications. This configuration yields heat-resilient structures ensuring ecological and economic benefits while substantially dependence on mechanical cooling systems.

Complete Specification

Description:TECHNICAL FIELD

[001] The present invention relates to sustainable construction and energy management, and more particularly to heat-resilient buildings comprising metal oxide cl blocks integrated into concrete wall structures configured to absorb thermal energy produced by sunlight, thereby mitigating heat gain and providing energy storag capabilities.

BACKGROUND

[002] In the field of sustainable construction and energy management, concrete wall structures have long served as the primary building envelope material owing t structural robustness, availability, and cost-effectiveness. Conventional concrete wall structures are typically composed of Portland cement, aggregates, and water, designed principally for load-bearing and weatherproofing functions. However, the thermal characteristics of conventional concrete render it a passive absorber of radiation. When sunlight falls upon an exposed concrete surface, the concrete absorbs substantial quantities of thermal energy, which is thereafter conducted prog through the wall into the building interior. This phenomenon, widely referred to as solar heat gain, is a well-recognised limitation of conventional concrete construc warm and tropical climates.

[003] The consequences of unmitigated solar heat gain in concrete structures may be significant. Buildings constructed from conventional concrete wall structures t exhibit elevated indoor temperatures during daylight hours, particularly in regions subject to intense solar irradiance. Occupants of such buildings may require mec air-conditioning systems operating over extended durations to maintain thermal comfort. The resulting increase in electrical energy demand places a substantial bu energy infrastructure, contributes to peak-load stresses on power grids, and is associated with increased greenhouse gas emissions where electricity generation rel

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