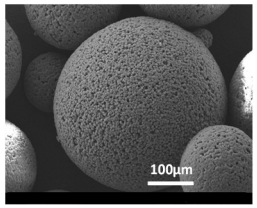
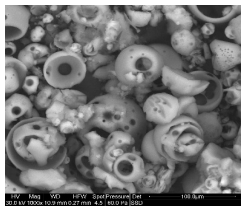
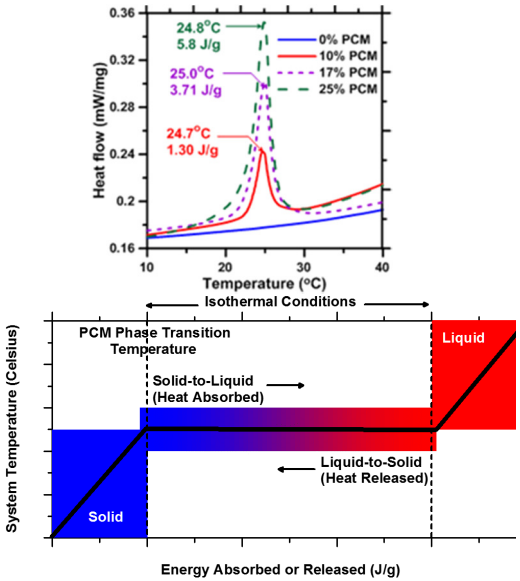




Phase change materials (PCM) are combined sensible and latent thermal storage materials that can be used to store and dissipate energy in the form of heat.

ECLIPS develops methodologies to incorporate climate, and application-specific phase-change materials (PCMs) into concrete to address thermal-related cracking in infrastructural concrete.



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ECLIPS
Enhancing Concrete Life in Infrastructure through Phase Change Systems

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Funded By:

Infravation
An Infrastructure Innovation Programme

Partnering Institutions

ASU Arizona State University

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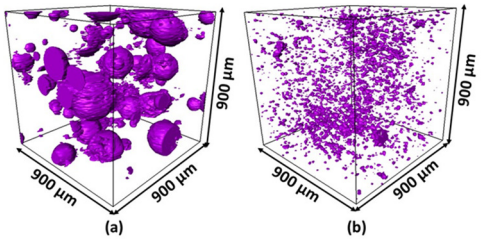
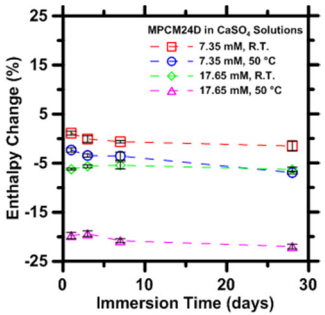
Phase change materials can be incorporated in concretes without detrimentally influencing the mechanical and durability properties

- Comparable compressive and flexural strengths to that of conventional concrete at low volumes of microencapsulated PCM.
- Easily dispersed in concrete



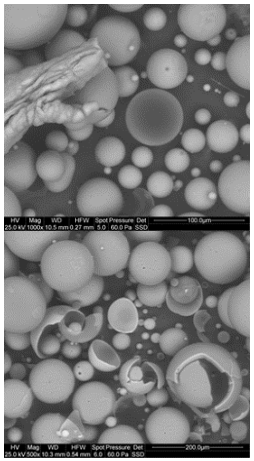
- Chemical stability not compromised



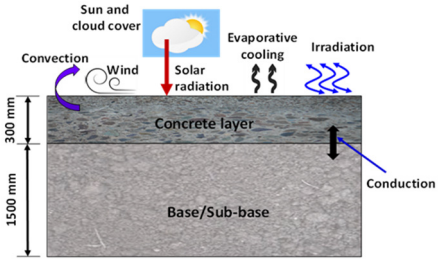
- Regulates the internal temperature rise in hydrating cementitious systems early heat of hydration
- Reduces the magnitude of repetitive thermal deformations and stresses over an extended period

Novel encapsulation methods for PCMs. Silica shells used as the encapsulation medium.

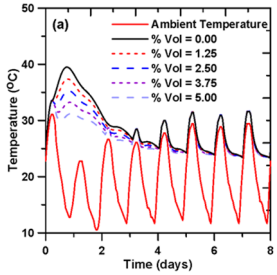
Based on the temperature of phase change, different chemicals including paraffins, heptadecane, and tetradecane can be encapsulated.



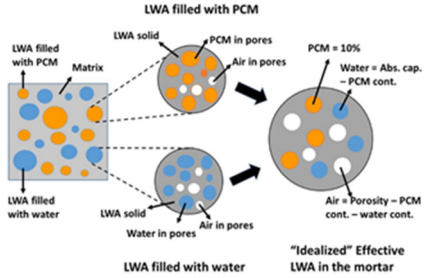
Thermal Modeling allows design of concrete containing phase change materials



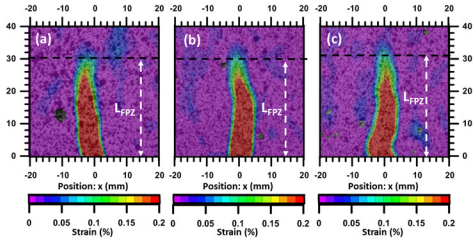
Models developed to predict temperature evolution in concrete pavements/bridge decks containing phase change materials.



Phase change materials can be impregnated in porous, lightweight aggregates to obtain desirable benefits



Compliant inclusions offer benefits in terms of crack propagation under mechanical load



Time to cracking extended when PCMs are used