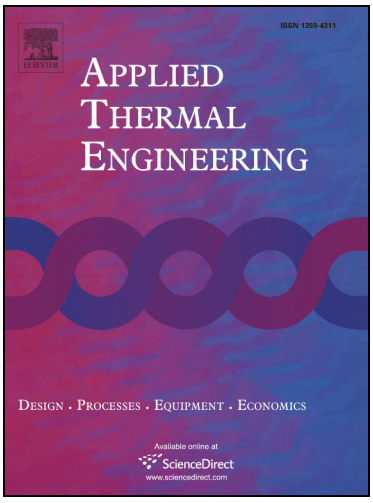


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# Integration of solar assisted solid desiccant cooling system with efficient evaporative cooling technique for separate load handling

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**Abstract:**

Air-conditioning load is generally composed of sensible and latent parts. Currently, various stand-alone electric and heat driven HVAC systems serve the purpose with each having performance limitations while managing cumulative load. However, integration of both electric and heat driven systems can be efficient especially if sensible and latent loads are handled separately. Here an integrated solar assisted cooling system is proposed consisting of a solid desiccant system for handling latent load and a Maisotsenko cycle (MC) based evaporative cooling system for sensible loads. The experimental setup consists of a purposely designed hybrid arrays of solar thermal collectors, a solid desiccant wheel with heat recovery and a coupled indirect MC evaporative cooler in cross flow arrangement. The integrated system is tested for the dehumidification effectiveness, dew point effectiveness, thermal COP, and cooling capacity. The resulted average cooling capacity of the system is around 3.78kW with average COP of 0.91 at solar fraction of about 70%.The uncertainties for cooling capacity and COP are± 8.6% and ±9.3%, respectively.