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Pickering Emulsification to Mass Produce Nanoencapsulated Phase-change-material XUEZHEN WANG, LECHENG ZHANG, Artie McFerrin Department of Chemical Engineering,Texas A&M University, College Station, TX, 7843-3122, USA, YI-HSIEN YU, Department of Materials Science and Engineering, Texas A&M University, College Station, TX, 77843-3122, USA, S. SAM MANNAN, Artie McFerrin Department of Chemical Engineering,Texas A&M University, College Station, TX, 7843-3122, USA, YING CHEN, Soft matter center, Guangdong Province Key Laboratory on Functional Soft Condensed Matter, School of materials and energy, Guangdong University of Tec, ZHENGDONG CHENG, Artie McFerrin Department of Chemical Engineering,Texas A&M University, College Station, TX, 7843-3122, USA, DR. CHENG'S GROUP TEAM — Phase changing materials (PCM) have useful applications in thermal management. However, mass production of micro and nano encapsulated PCM has been a challenge. Here, we present a simple and scalable method via a two-step Pickering emulsification method. We have developed interface active nanoplates by asymmetric modification of nanoplates of layered crystal materials. Nanoencapsulated PCM is realized with exfoliated monolayer nanoplates surfactants using very little energy input for emulsification. Further chemical reactions are performed to convert the emulsions into core-shell structures. The resulted capsules are submicron in size with remarkable uniformity in size distribution. DSC characterization showed that the capsulation efficiency of NEPCM was 58.58% and were thermal stable which was characterized by the DSC data for the sample after 200 thermal cycling.

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