



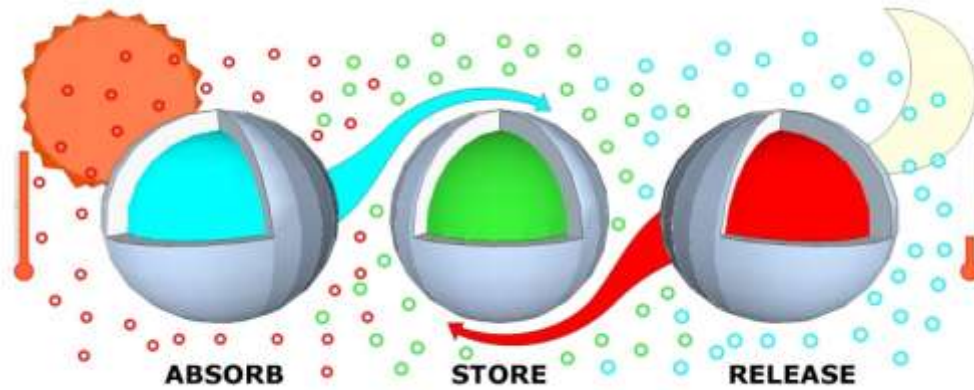
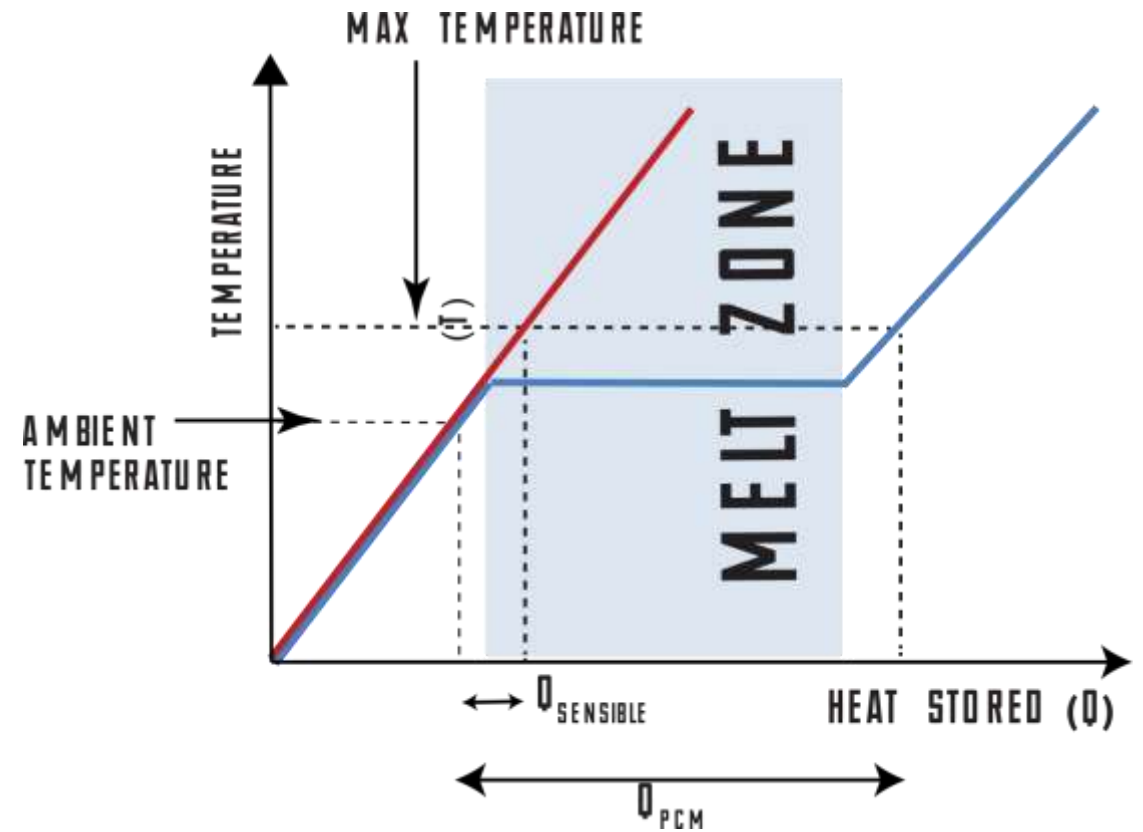
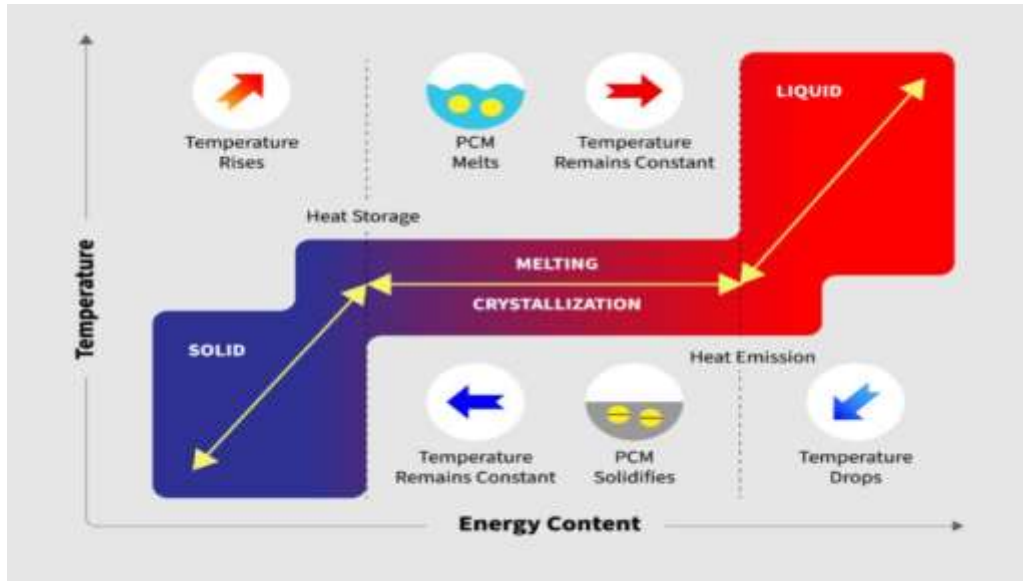
Panel: Changing the Game with Phase Change Materials (PCM)

Said Al-Hallaj, PhD

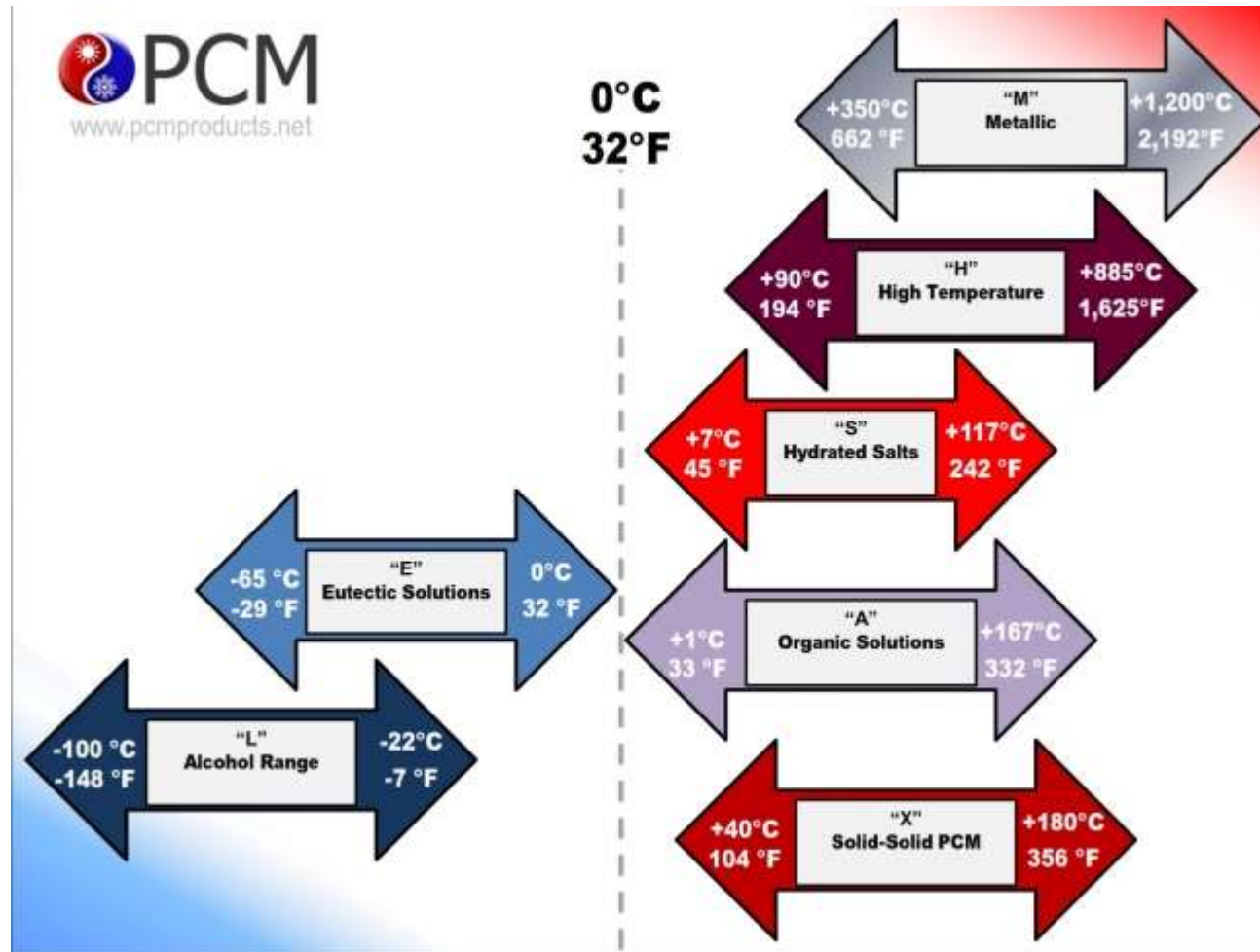
Department of Chemical Engineering, University of Illinois at Chicago

Chief Battery Scientist, Beam Global

PCM: how it works?

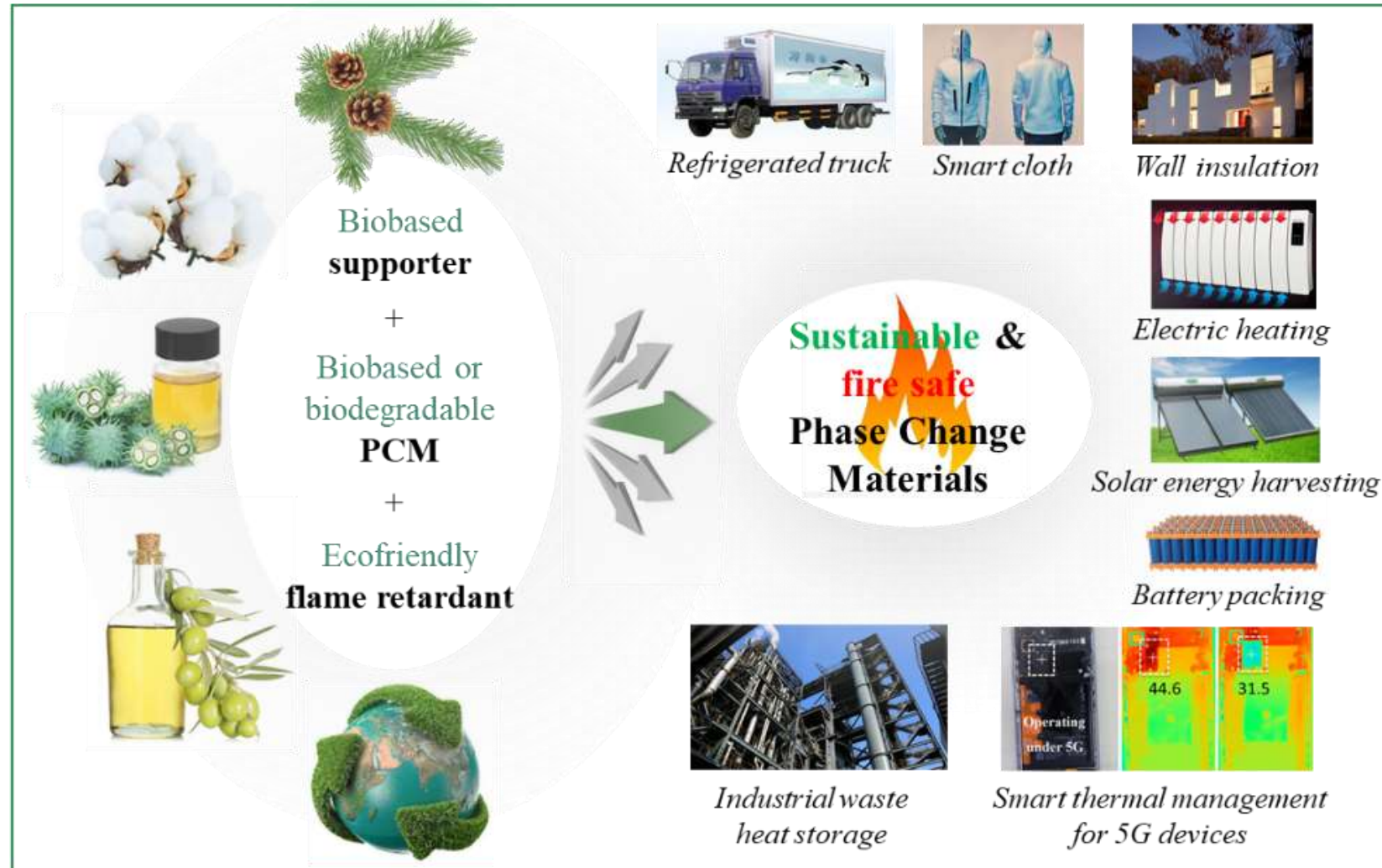


Types of PCM



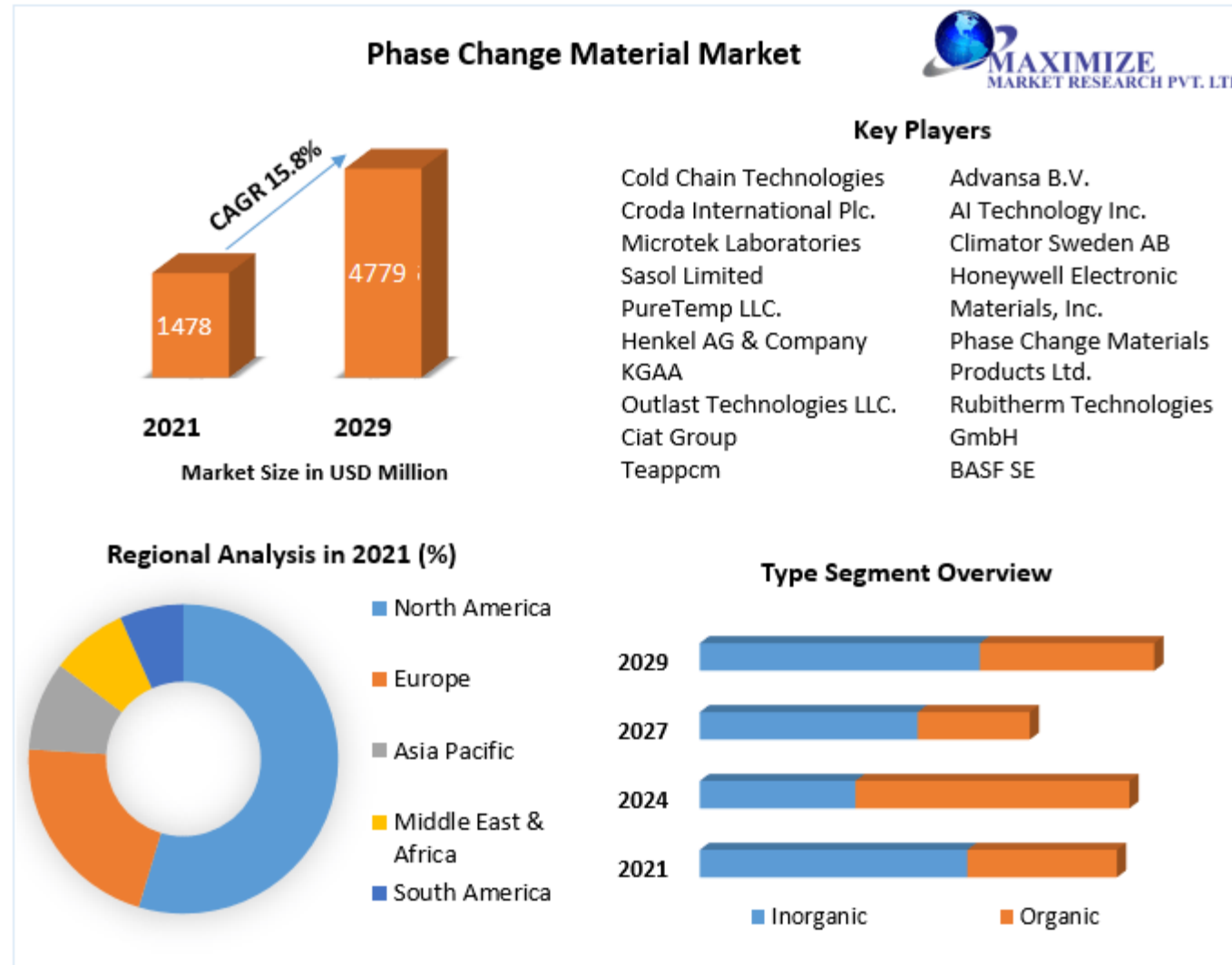
<https://www.pcmproducts.net/>

PCM Applications



<https://materials.imdea.org/sustainable-fire-safe-phase-change-materials/>

PCM Market



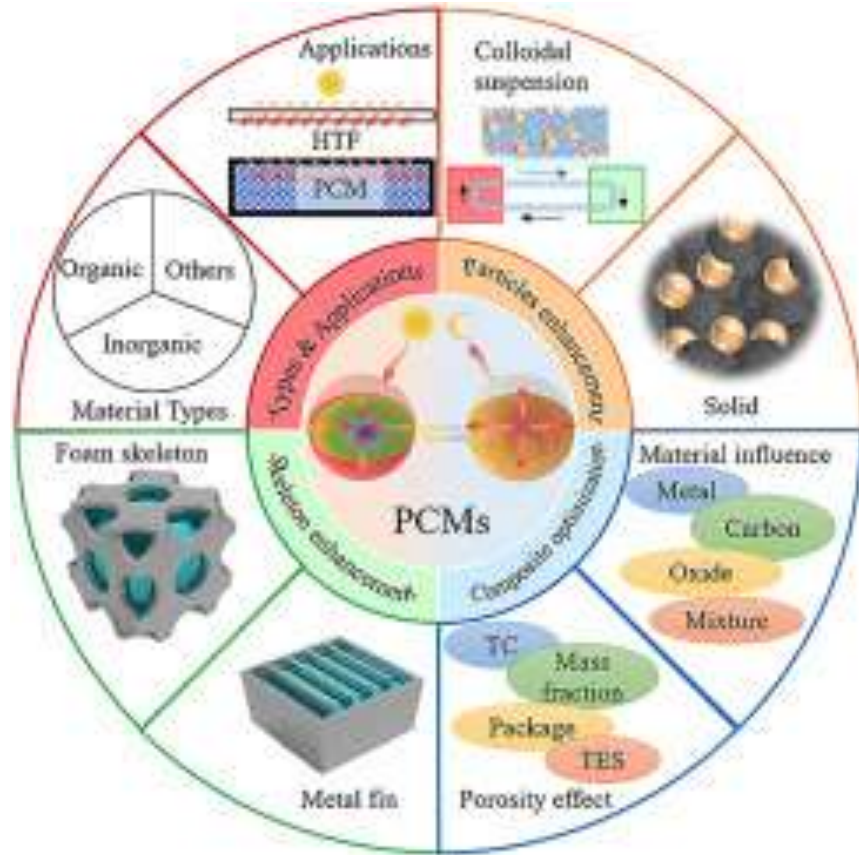
<https://www.maximizemarketresearch.com/market-report/phase-change-material-market/158051/>

PCM Challenges

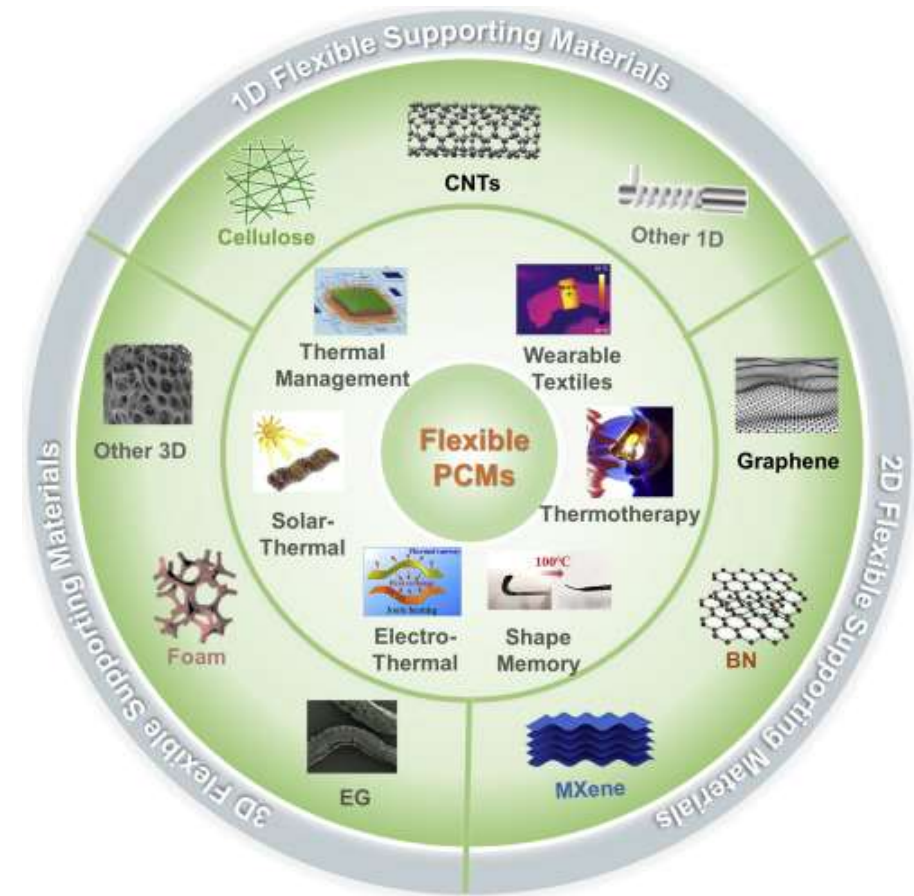
Thermal properties	Physical properties	Chemical properties	Economic and Environmental properties
Suitable melting temperature	Small volume change	Chemical stability	Abundant
High latent heat of fusion	Low vapor pressure	Non-toxic	Low cost
High specific heat	Phase equilibrium	Non-flammable	Recyclability
High thermal conductivity	Small phase separation	Non-explosive	Environmental friendly
Thermal stability	High density		
	Small supercooling effect		
	Good crystallization rate		

Vincenzo Bianco, Mattia De Rosa, Kambiz Vafai, [Applied Thermal Engineering Volume 214](#), September 2022, 118839

PCM Composites



Lin Qiu, Yuxin Ouyang, Yanhui Feng, Xinxin Zhang, Renewable Energy, [Volume 140](#), September 2019, Pages 513-538



Piao Cheng, Zhaodi Tang, Yan Gao, Panpan Liu, Changhui Liu, Xiao Chen, iScience, [Volume 25, Issue 5](#), 20 May 2022, 104226

Thank you!

Questions: sah@uic.edu