Flexible Foam New Thermal Interface Material

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Objectives

- Develop compliant, continuous and competitive thermal interface material for relatively lower heat flux application
- Characterize mechanical deformation, effective conductivity and total thermal resistance
- Extend model to generalized porous structure, research optimum structures and materials

Current TIM challenges

Pad type TIM require a high pressure, are costly and have lower thermal conductivity

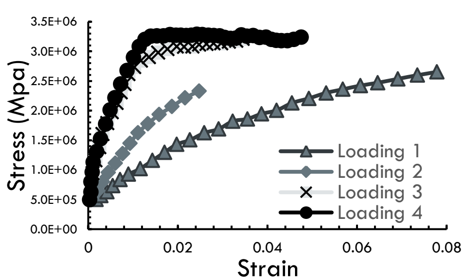
Thermal greases are not manufacturing friendly, have problems such as pump-out ,dry out. Difficult to control thickness and guarantee electrical insulation

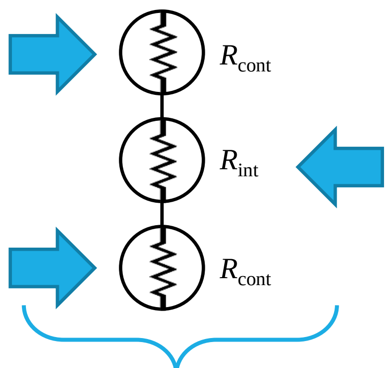
Conclusions

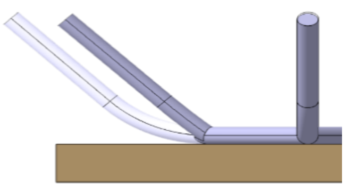
- Developed predictive models for effective bulk conductivity and area of contact as an effect of porosity and pore size
- Characterized thermal performance and mechanical compliance of porous structure through experimentation and simulations for validation
- Thermal performance enhancement achieved by filler material

Achievements

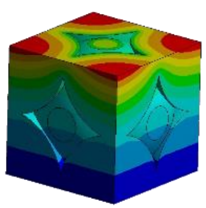
Effective Mechanical Properties





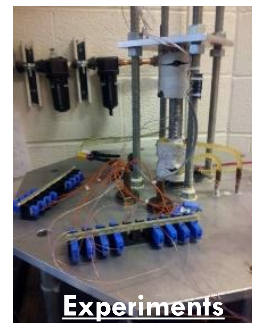


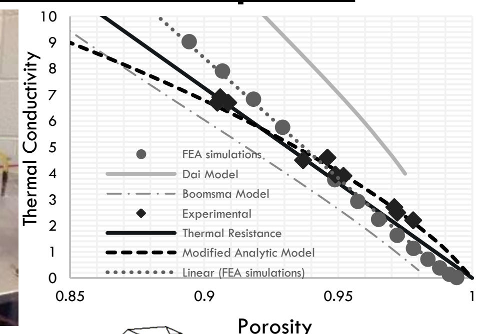
Analytic Models

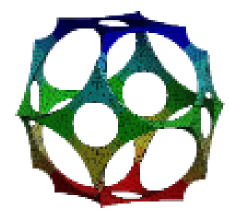


Simulations

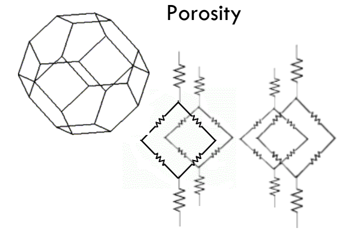
Effective Thermal Properties





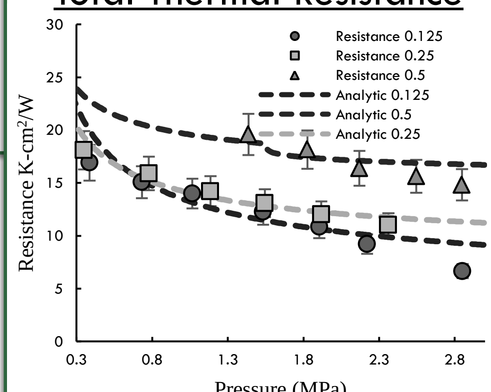


Simulations



Analytic Models

Total Thermal Resistance



Member Benefits

- Resistance against pressure curves for variations of porosity, PPI and filler material
- Predictive analytic model for bulk conductivity, verified through simulation and experimentation
- Software tool - guide to optimum design

Publications

N. Trifale, K. Yazawa, and E. Nauman, Proc. *ASME IMECE 2013*-64132, 2013.

N. Trifale, K. Yazawa, and E. Nauman, International Journal of Heat and Mass Transfer, (In review)