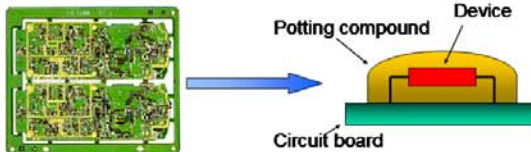


N. P. Theodorakos (BSChE) and R. E. Jenson (ARL)

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Electronic Potting Compounds



- Protection
 - Moisture
 - Impact (low velocity)
- Low Coefficient of Thermal Expansion
 - Thermal cycling
- Glass filled epoxy
 - $V_{f, glass} = 0.55$
 - $\rho_{glass} = 2.54 \text{ g/cm}^3$, $\rho_{epoxy} = 1.15 \text{ g/cm}^3$

Motivation: Enhanced Shock Resistance



- Electronic assemblies
 - Aerospace
 - Military
- High G-forces, $P = MV$
 - Momentum
- Maintain
 - Moisture protection
 - Low CTE

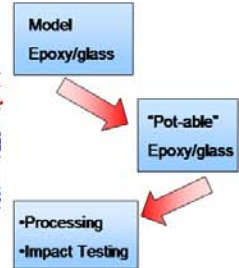
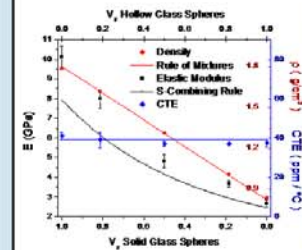
Solution – Low density glass microsphere filler



$\rho_{solid} = 2.54 \text{ g/cm}^3$

$\rho_{hollow} = 0.1 - 0.5 \text{ g/cm}^3$

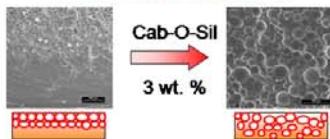
Properties – Mixed Solid and Hollow Filler



Epoxy Matrix
 $V_{f, glass} = 0.45$, constant
 $\rho_{solid} = 2.54 \text{ g/cm}^3$
 $\rho_{hollow} = 0.37 \text{ g/cm}^3$

M. Quesenberry, R. McCullough, R. Jensen, results to be published

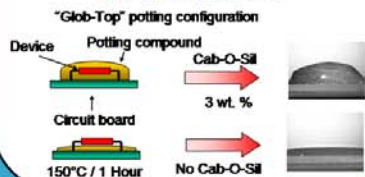
Thixotropic Modifier



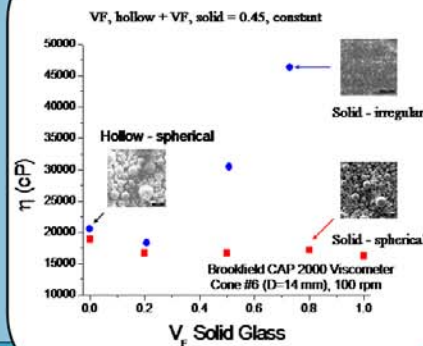
Cab-O-Sil 3 wt. %

Cab-O-Sil TS-720 Treated Fumed Silica

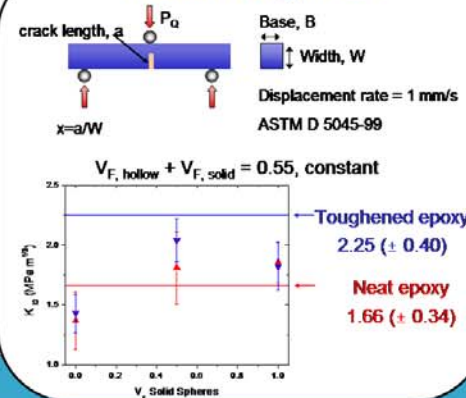
Resin Run-Out



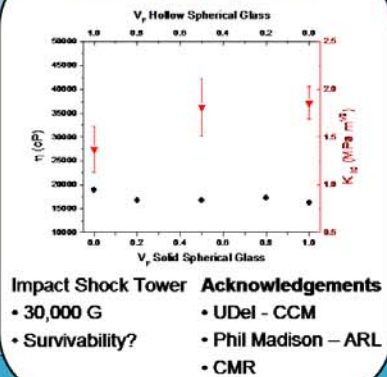
Processing Viscosity



Fracture Toughness



Advanced Properties



- Impact Shock Tower Acknowledgements
- 30,000 G
 - Survivability?
 - UDel - CCM
 - Phil Madison - ARL
 - CMR