Langley Research Center - Soluble Imide (LaRC-SI), Bonding Experiment

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Background

- Success
- Multi-layer Circuit Vias
- Plasma Etch
- Bonding Multiple Layers
- Bonding Experiment
- Bonding Experiment Results
- Summary

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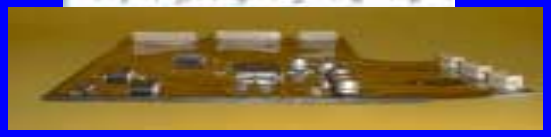
Success

- GIFTS 5-Layered Circuit (large vias)
- Flex Cable (two layers, no vias)
- Circuit to structure (one layer)



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Multi-layer Circuit Vias

- Drill (labor intensive)
- Punch (labor intensive)
- Laser (expensive)
- Plasma Etch (inexpensive)

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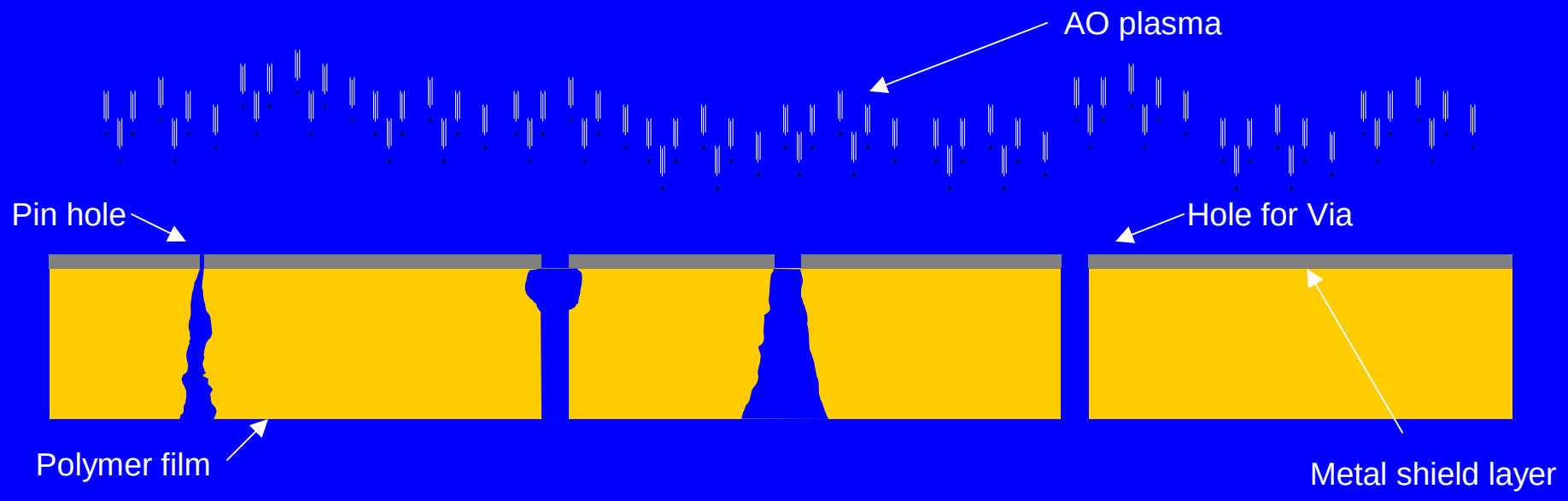
Plasma Etch



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Bonding Multiple Layers

Un-etched via

Etched via

Assembled GAMS circuit with LaRC-SI flow into via

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Bonding Experiment

- To determine the precise temperature and pressure needed to perform an adhesiveless melt-bonding multiple layers of film into one homogenous material

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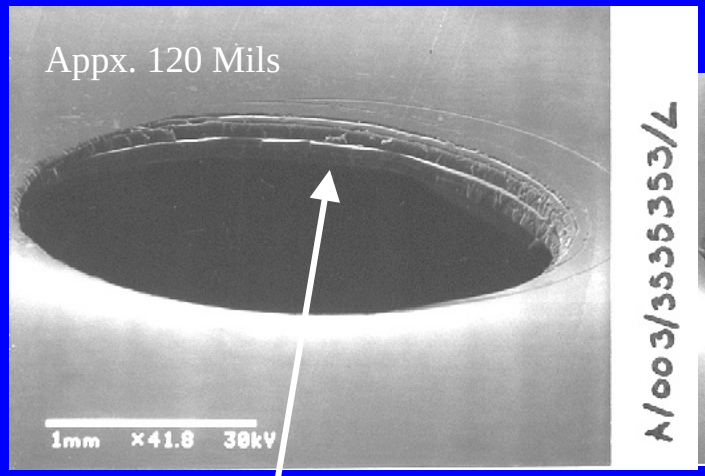
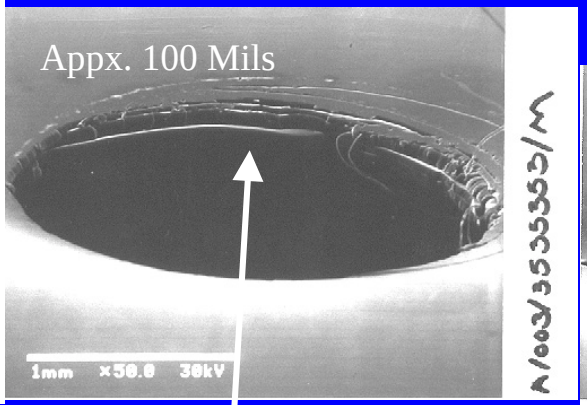
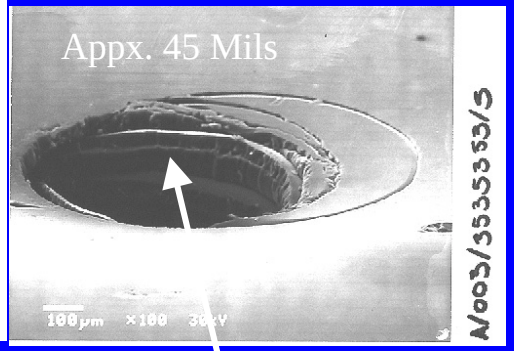
Bonding Experiment Results

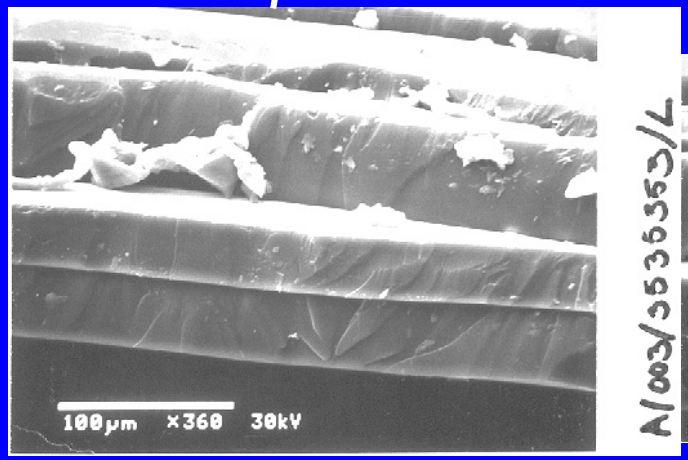
Test A/003/3535353; 275C, 100PSI, 1Hr.Soak

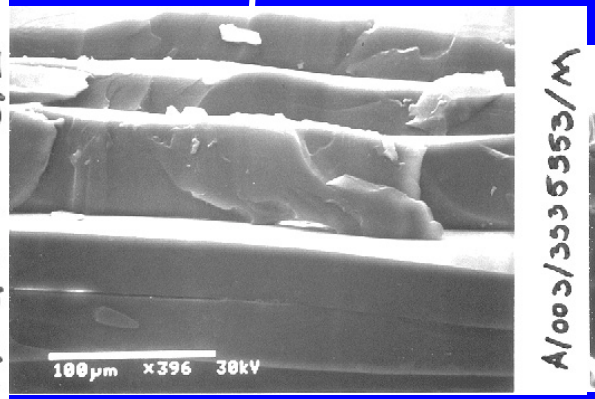
SEM Photos:

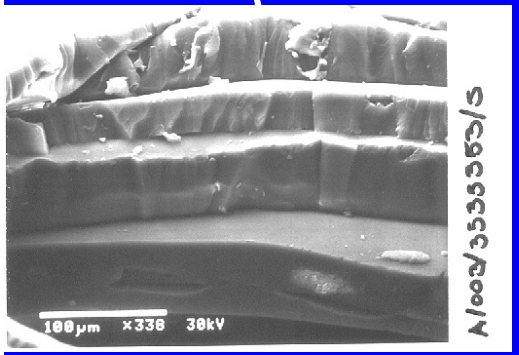












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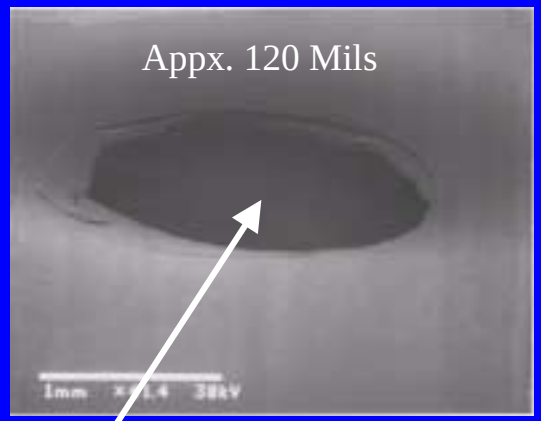
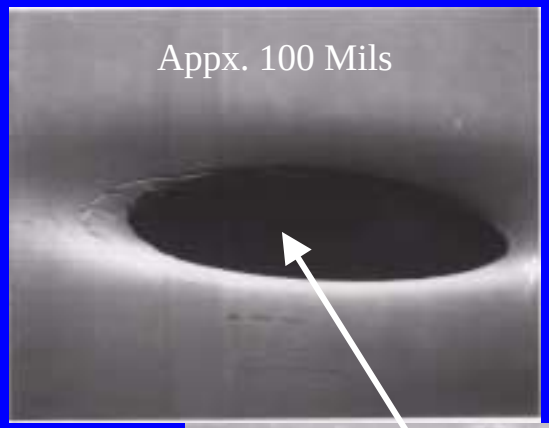
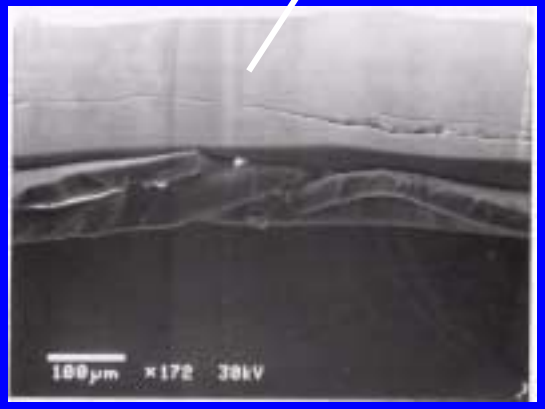
Bonding Experiment Results

Test A/002/3535353; 300C, 100PSI, 1Hr.Soak

SEM Photos:







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Summary

- 3% offset LaRC-SI material is excellent for forming monolithic circuits and cables
- 3% offset material should not be used for small multi-layer circuit applications were blind vias are needed
- 0.5% offset material results need to be further studied for small multi-layer circuit applications involving blind vias

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- GIFTS layout — Michael Holloman
- GAMS layout — James Adams

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