Films and Bifilms
An Update

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Lustrous carbon film on gray iron
Top gated turbulent filling
Entrainment Defects

1. Bifilms
2. Bubbles
Surface Turbulence entraining Bifilms and Bubbles
RPT Before and After Reduced Pressure
Microporosity (partly opened bifilms)
Fracture surface Mg alloy AZ91

Prof John Berry MSU 2008
Fracture surface Mg alloy AZ91

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Fracture surfaces from parts of the same Al-4.5Cu alloy casting with and without an entrainment event.
Cracked bifilm substrates for $\beta$-Fe and Si particles
Fracture surface of an Al-Si alloy

Courtesy Murat Tiryakioglu
Conclusions

• Solidification cannot create pores or cracks (there are no such things as *solidification defects*)

• Pores and cracks are *casting defects* and constitute the *only* source of Griffith cracks.

• Metals without entrained defects cannot fracture.
The End