

Table 5. 1 The equivalent loss factor of the ECAs under impact test conditions

Material	The Loss Factor, Tan δ			
	90°C	60°C	25°C	-70°C
<b>ECA1</b>	0.025	0.018	0.013	0.02
<b>ECA2</b>	0.1	0.03	0.017	0.016
<b>ECA3</b>	0.067	0.155	0.035	0.017

Table 5. 2 Impact performance results of conductive adhesives

Material	Drop test performance	Falling wedge test performance, J/m <sup>2</sup>
ECA1	5 samples failed at 1 drop	185
ECA2	4 samples failed at 1 drop, one failed at 2 drops	173
ECA3	2 samples failed at 3 drops, 3 samples failed at 4 drops	232

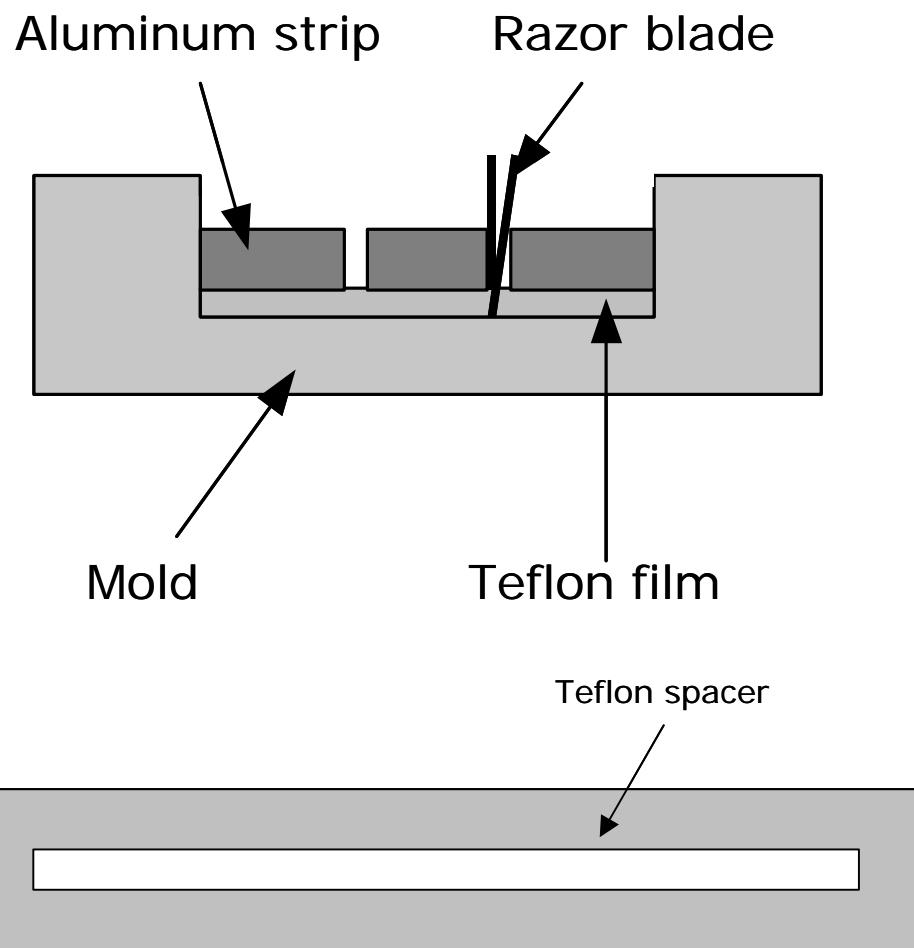


Figure 5.1 Schematic of Teflon spacer fabrication.

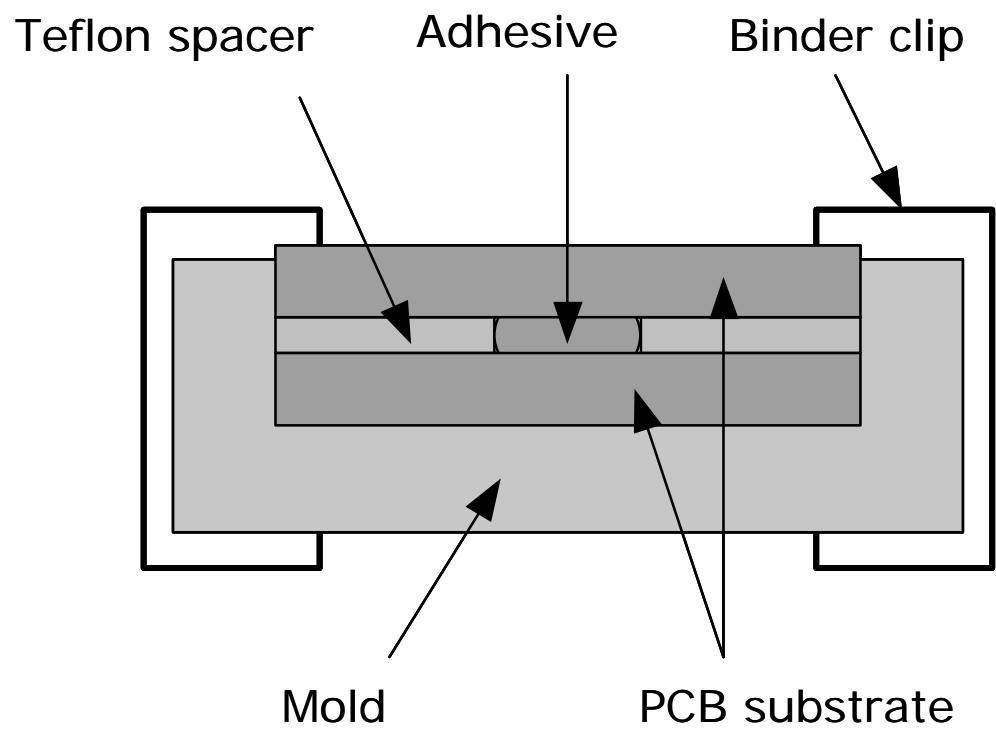


Figure 5. 2    Sample fabrication configuration.

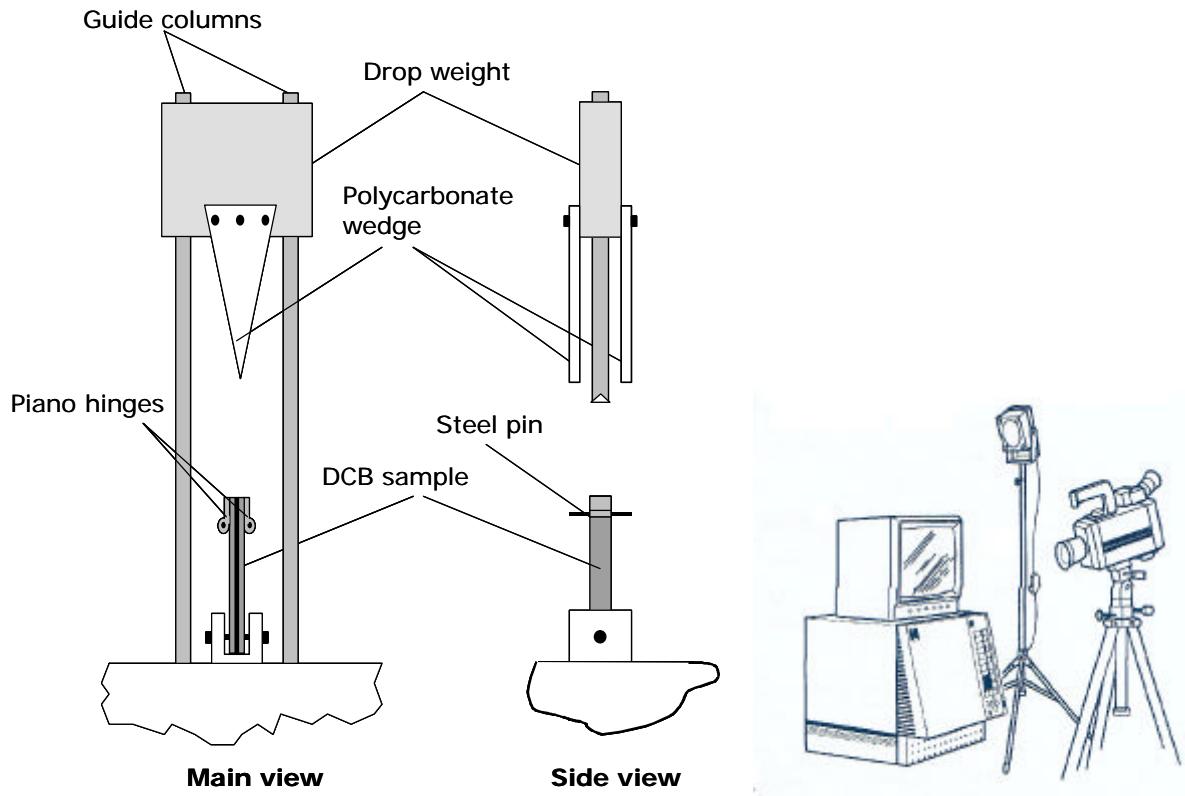


Figure 5. 3 Falling wedge test apparatus showing the drop tower arrangement and the high-speed digital camera from [15].

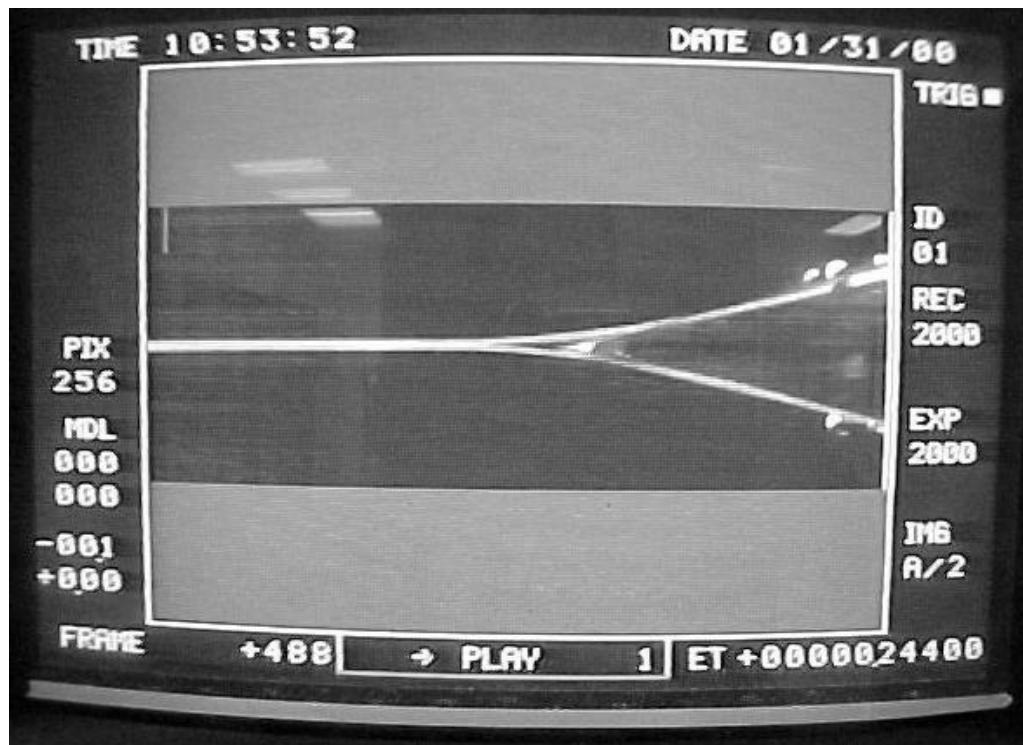


Figure 5.4 A photographic frame of a falling wedge test

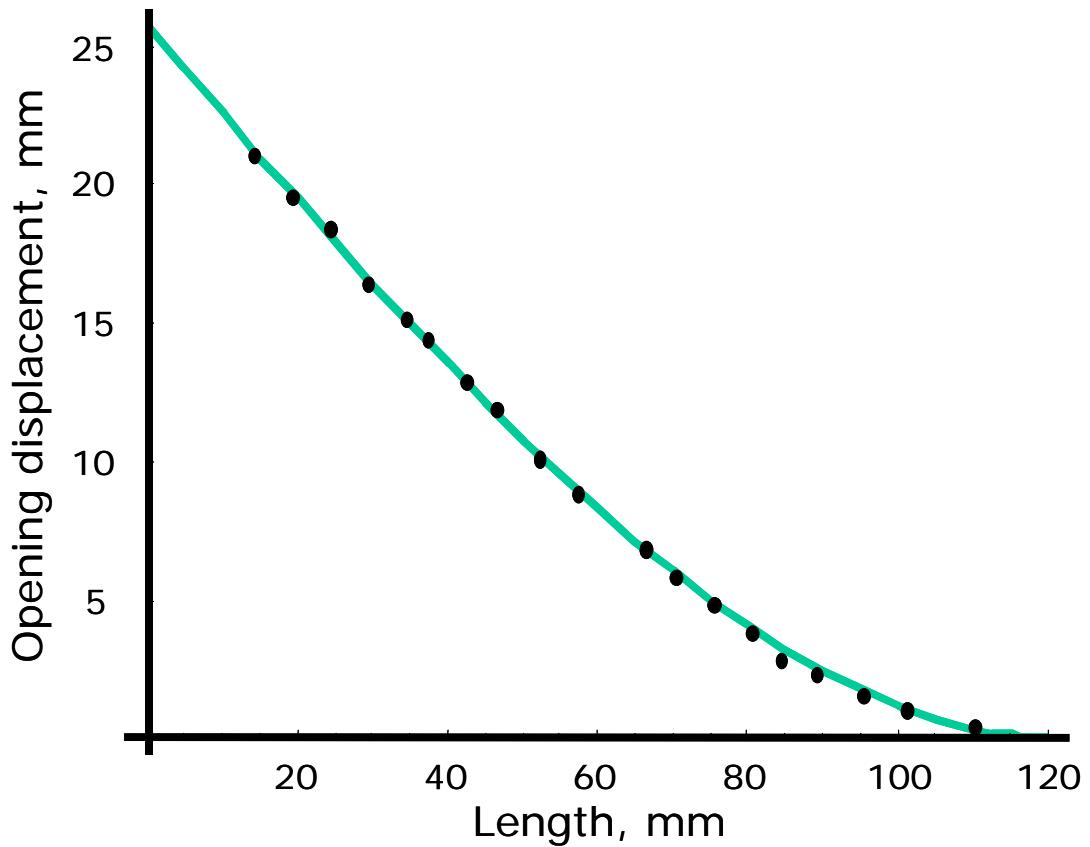


Figure 5. 5 Fitting of experimental data with beam theory

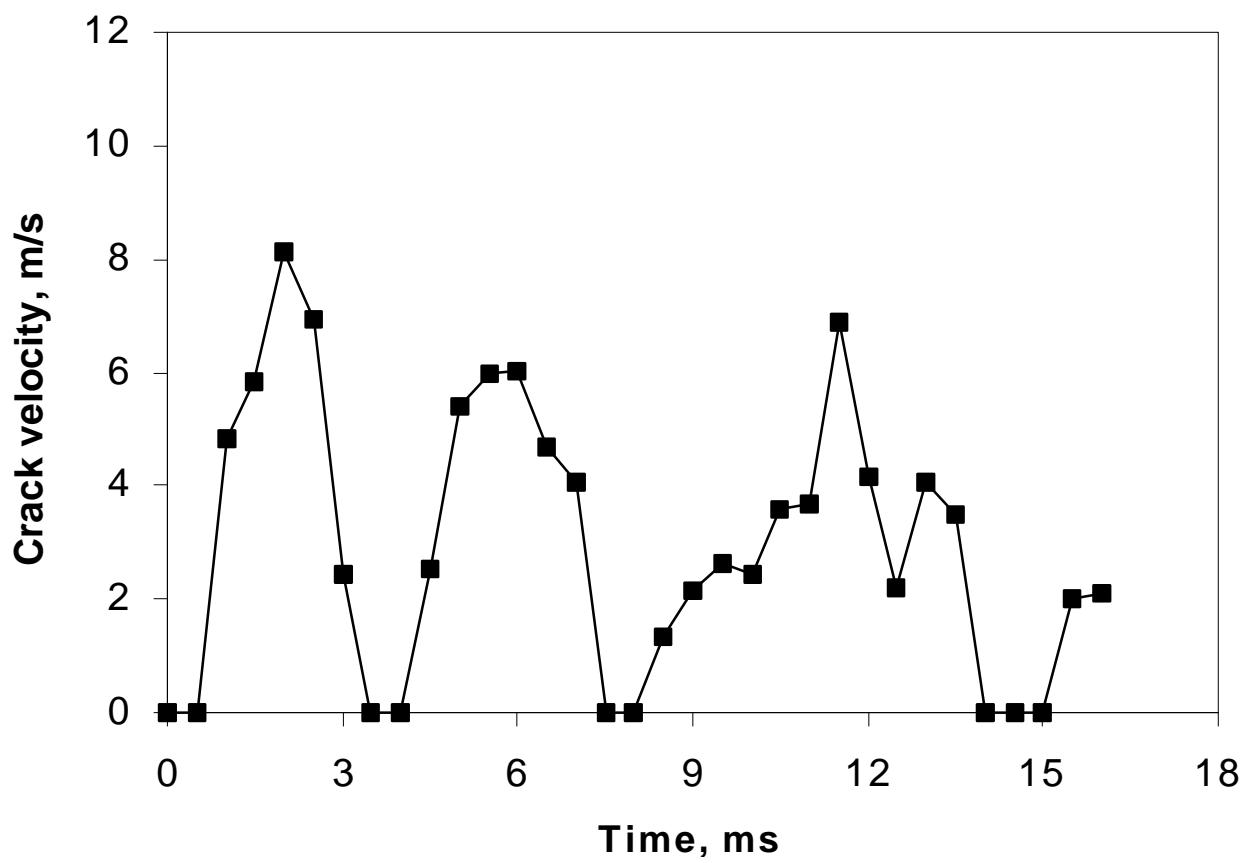


Figure 5.6    Typical crack velocity versus time trace

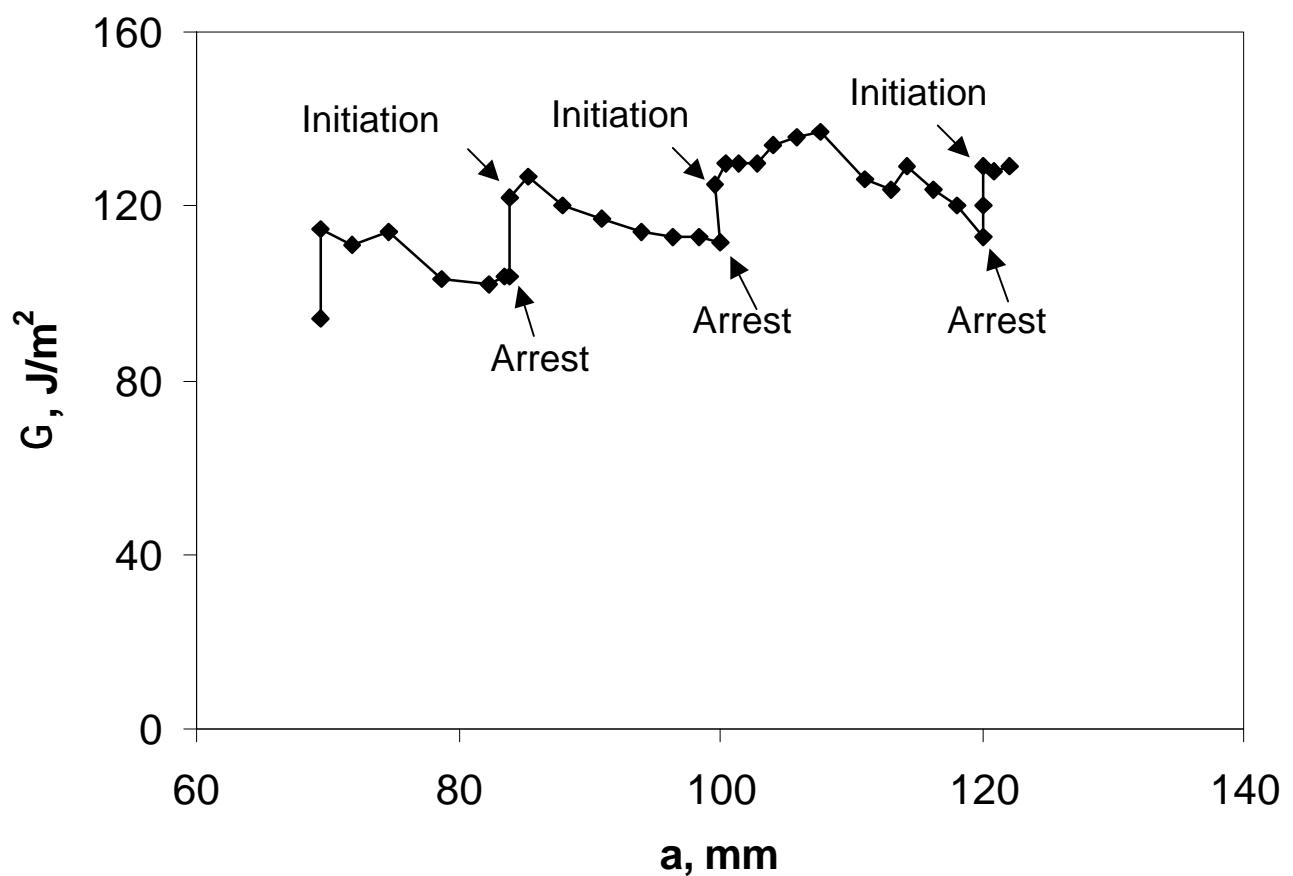


Figure 5. 7 Typical fracture energy versus crack length trace.

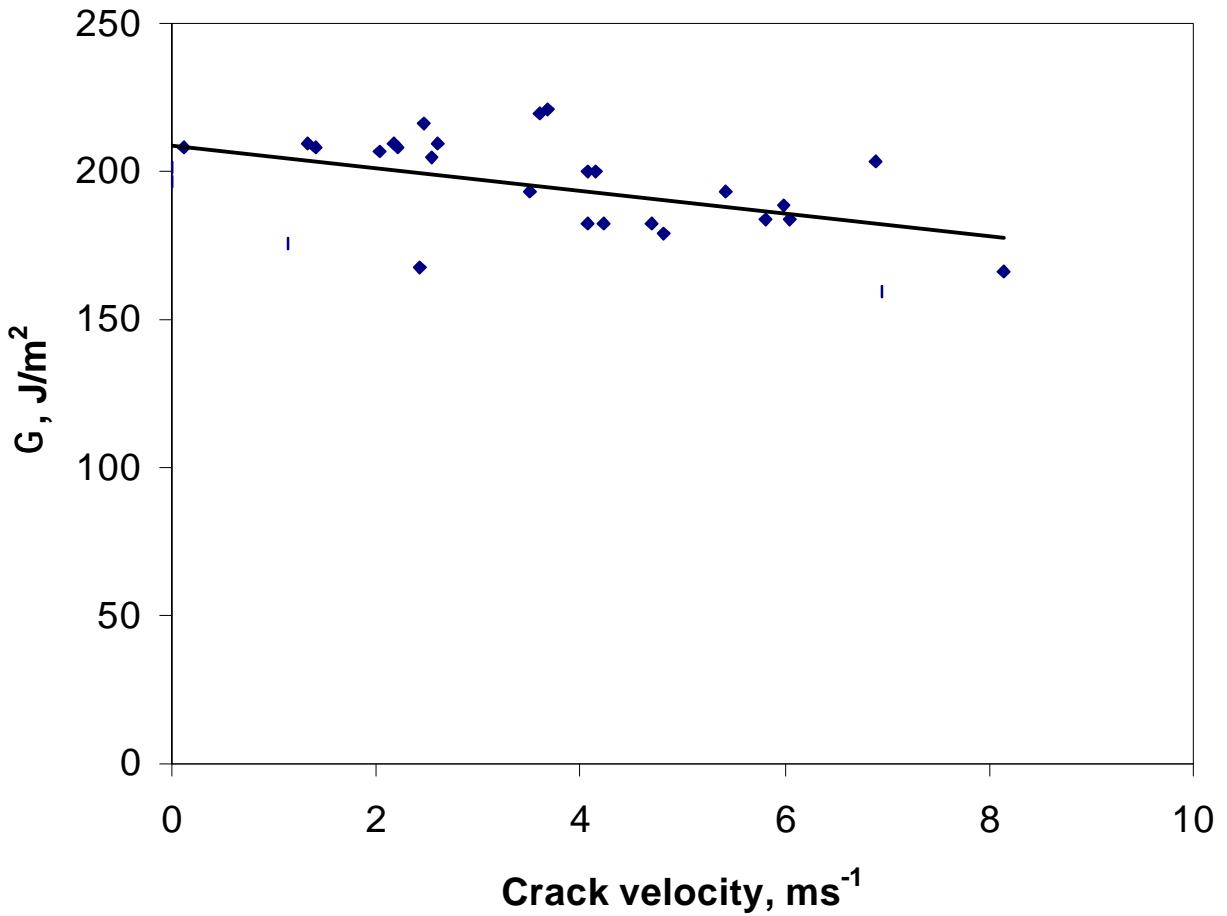


Figure 5.8 Typical plot showing the fracture energy versus crack velocity for ECA1 tested at room temperature.

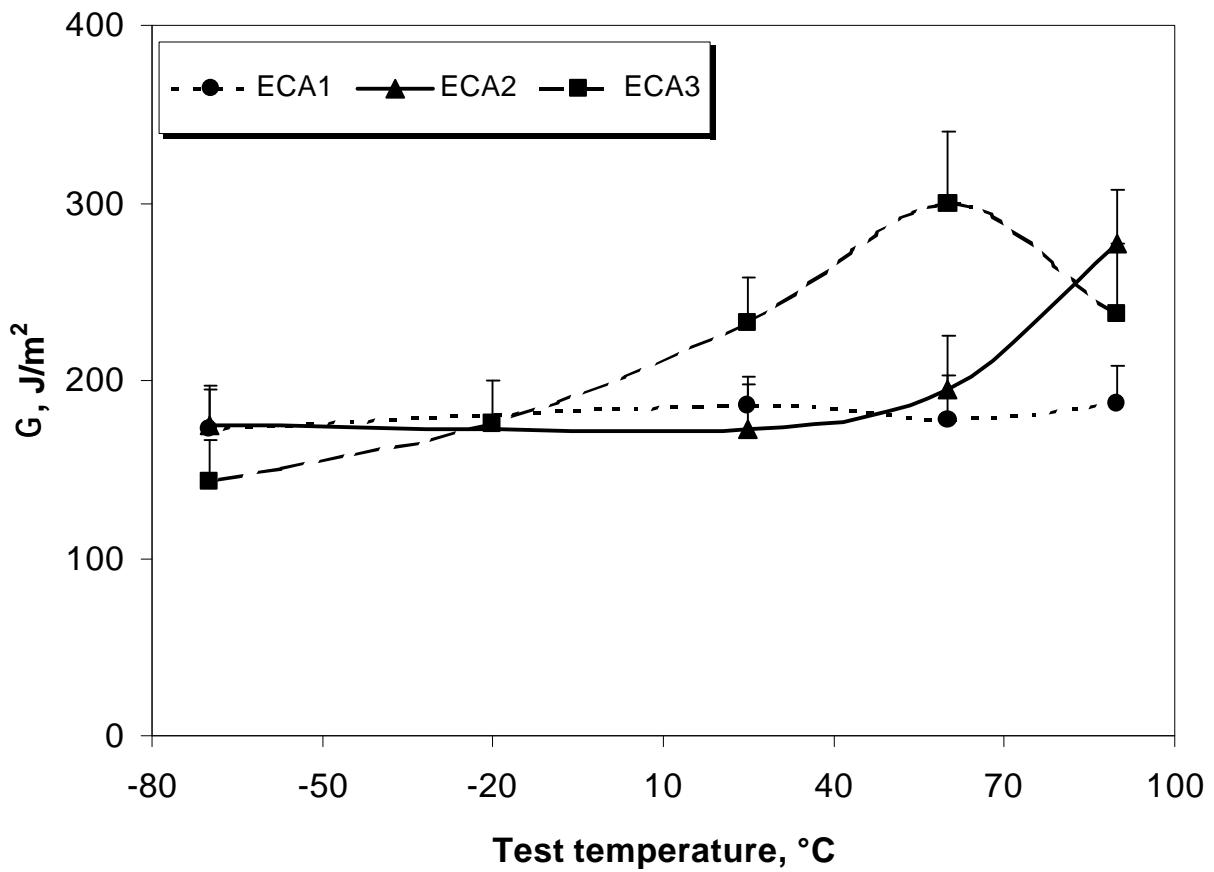
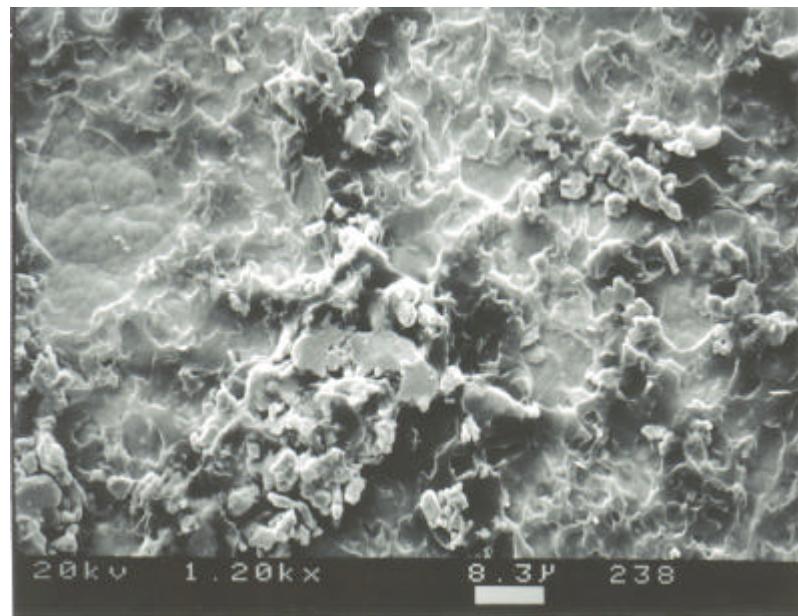
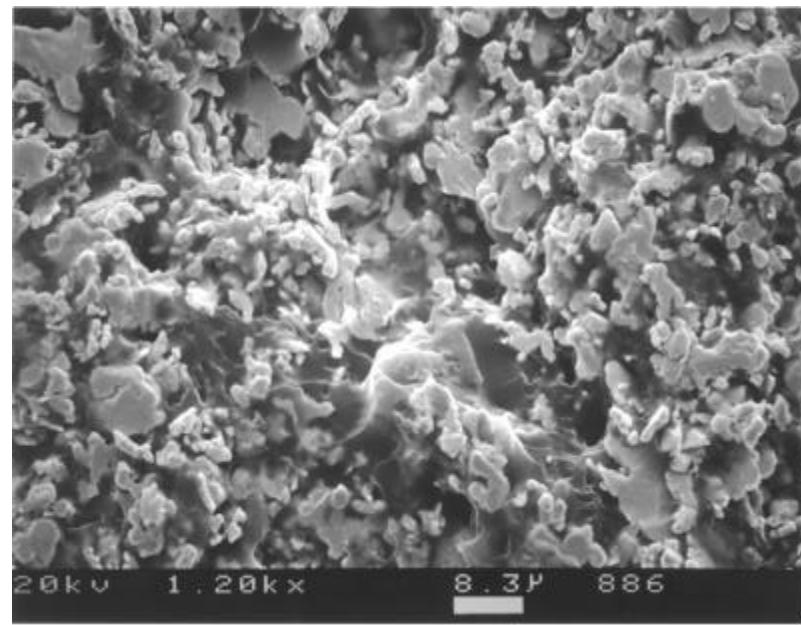


Figure 5. 9 Summary of the falling wedge test results



(a)



(b)

Figure 5. 10 Micrographs of the fracture surfaces of ECA3 adhesive joints tested at (a) 60°C, and (b) -70°C.

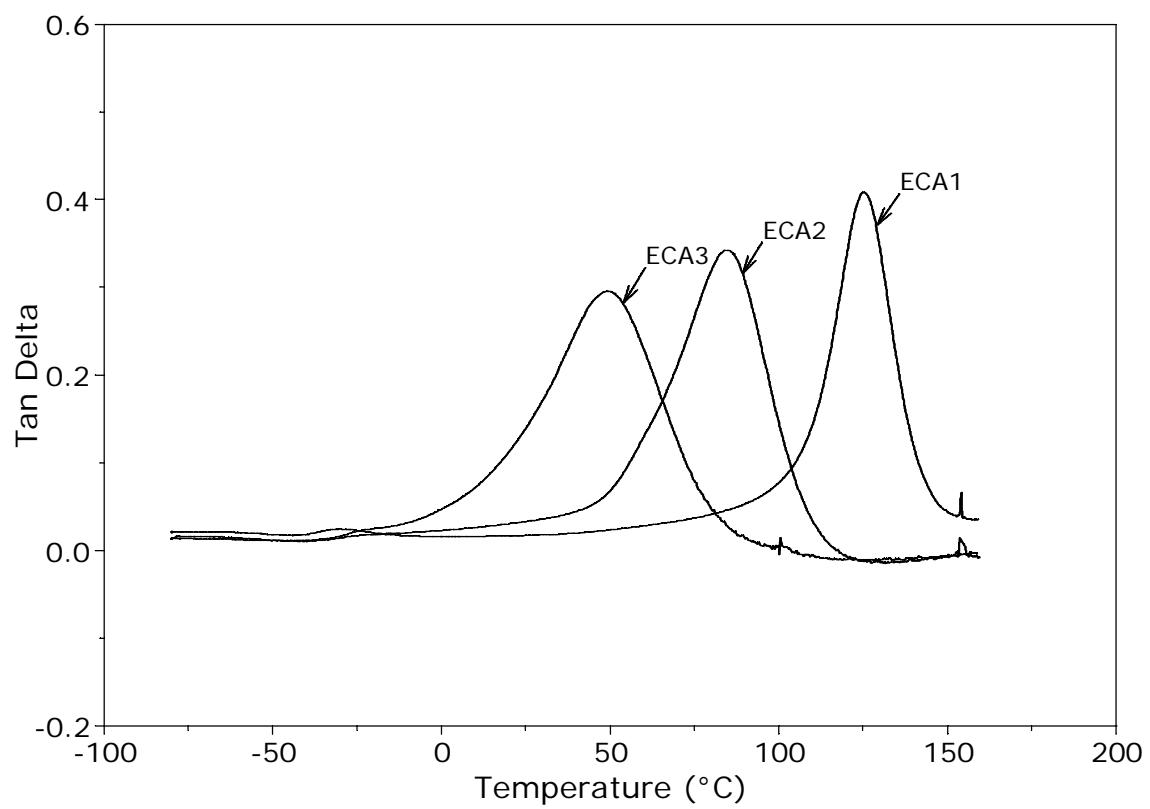


Figure 5. 11 Changes of  $\tan \delta$  of conductive adhesives with temperature.

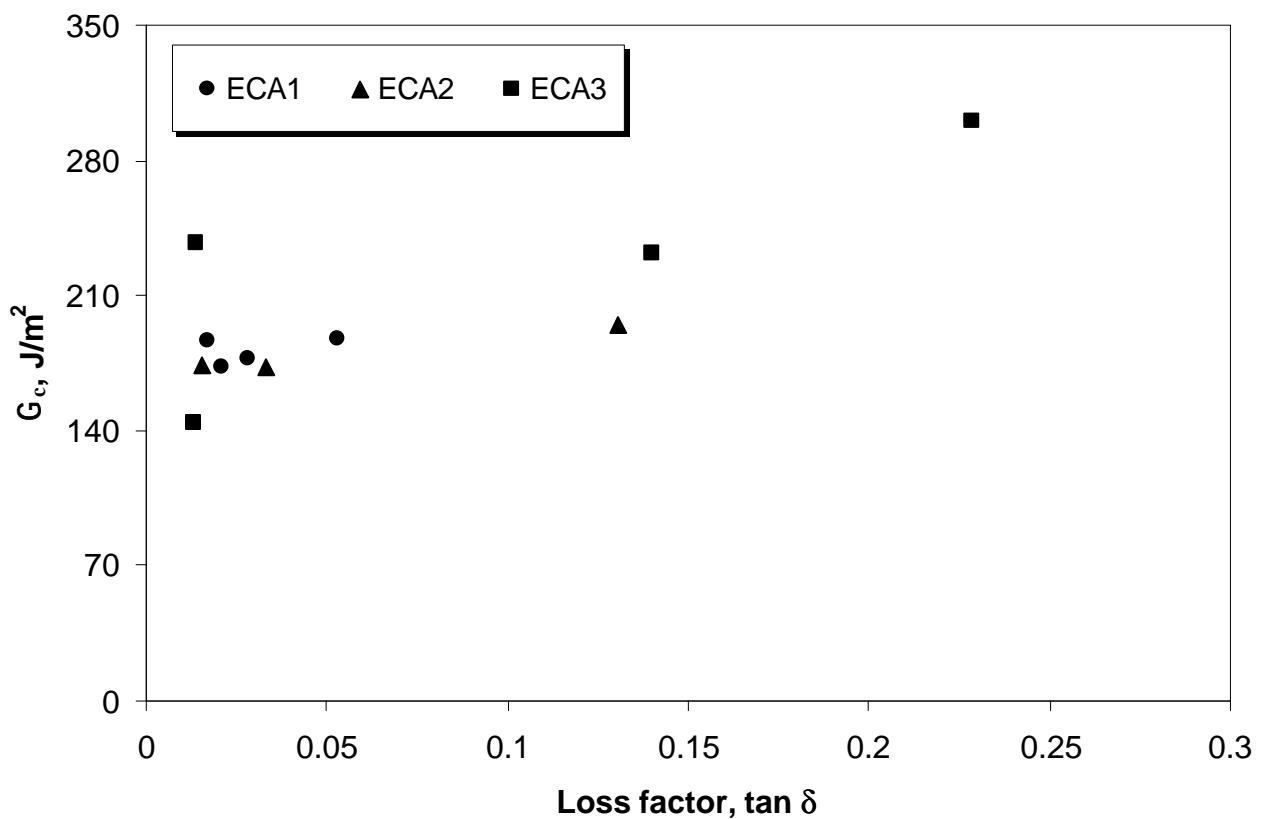


Figure 5. 12 Correlation of the fracture energy and the loss factor obtained at 1 Hz

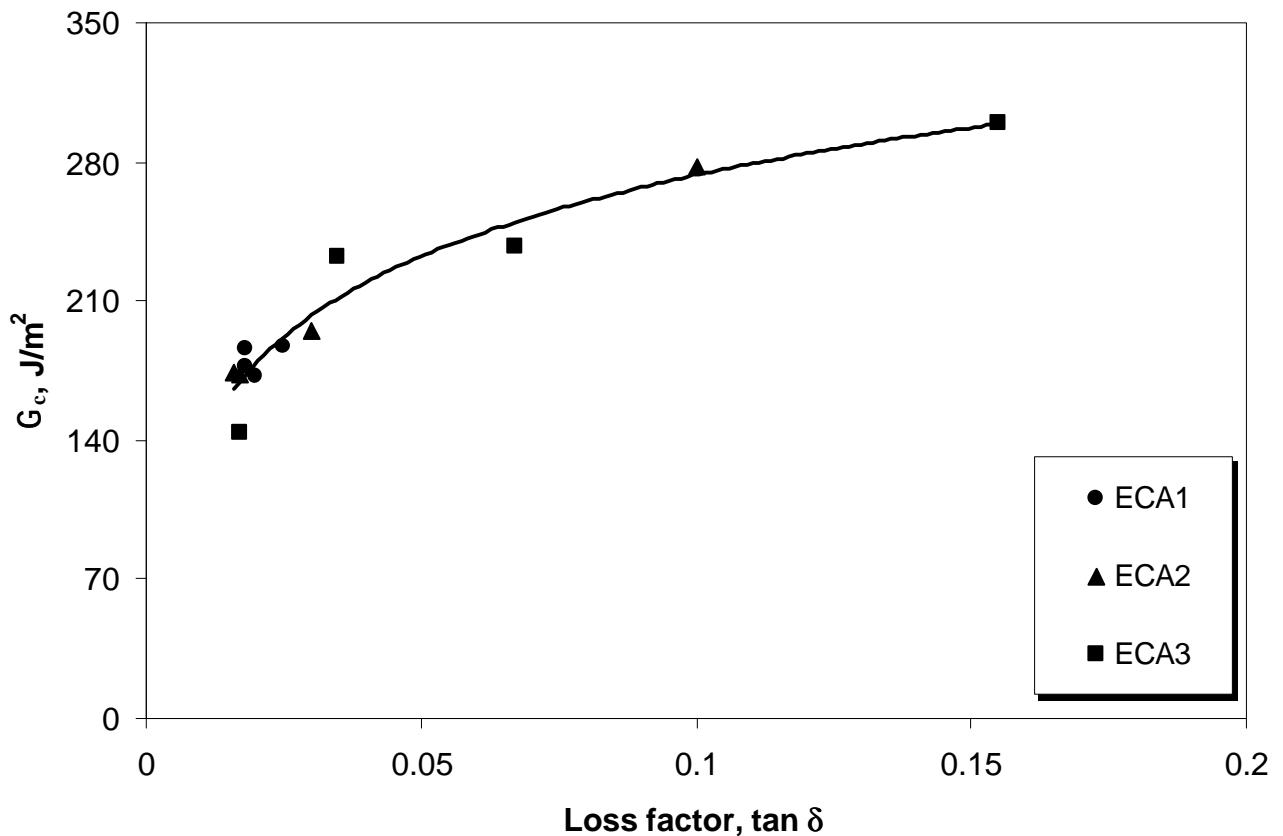


Figure 5. 13 Correlation of the fracture energy and the equivalent loss factor.