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This is an author produced version of a paper published in **Scripta Materialia**.

### **Figures and Tables**

White Rose Research Online URL for this paper:

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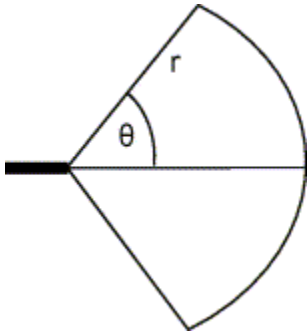
### **Published paper**

Corteen, J., Rainforth, M., Todd, I. (2011) *A mathematical approach to transformation toughening in bulk metallic glasses*, Scripta Materialia, 65 (6), pp. 524-527

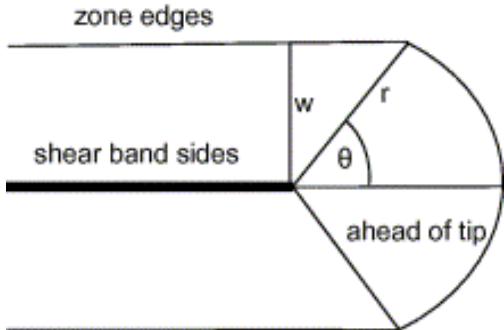
<http://dx.doi.org/10.1016/j.scriptamat.2011.06.018>

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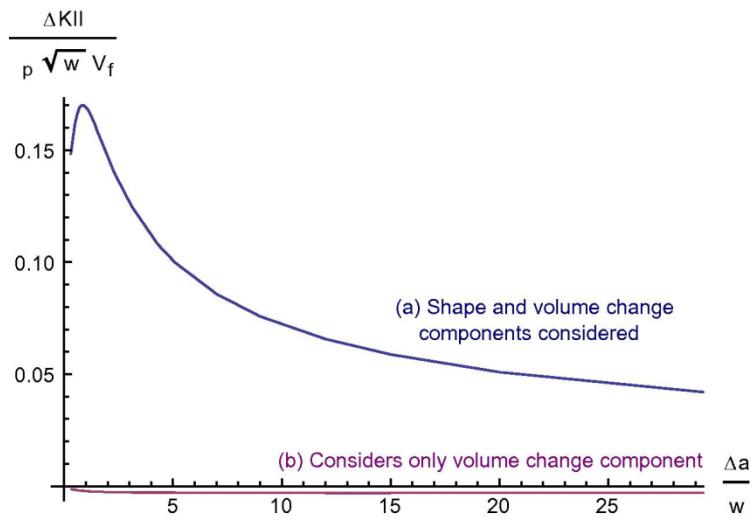
Figure 1: Co-Ordinate System



**Figure 2: Calculation Regions**



**Figure 3. Contribution to toughening**



**Table 1: Materials Properties for  $\text{Cu}_{47.5}\text{Zr}_{47.5}\text{Al}_5$**

Poisson's Ratio	$E_p/\text{Gpa}$	$E_m/\text{Gpa}$	$\Delta G/\text{J mol}^{-1}$	$eT$	$eS$
0.373 [12]	82 [12]	82 [12]	$2.702^*T-1408.52$ [13]	0.00137 [5]	0.124 [5]

Values are evaluated for  $T=298\text{K}$  and with a sample initial stress intensity factor of  $5\text{MPa m}^{1/2}$ .

**Table 2: Stress Intensity Factor Change with Crack Advance**

$\Delta w/a$	$\Delta K_{II}/(E_p \cdot V_f \cdot \sqrt{w})$	$\Delta w/a$	$\Delta K_{II}/(E_p \cdot V_f \cdot \sqrt{w})$
0.3	1.48E-01	1.8	1.52E-01
0.5	1.62E-01	2.3	1.40E-01
0.6	1.66E-01	3.1	1.25E-01
0.7	1.69E-01	4.3	1.08E-01
0.8	1.70E-01	5.1	9.98E-02
0.9	1.70E-01	7	8.58E-02
1	1.69E-01	9	7.58E-02
1.1	1.68E-01	12	6.57E-02
1.2	1.66E-01	15	5.88E-02
1.3	1.64E-01	20	5.09E-02
1.4	1.62E-01	30	4.14E-02
1.5	1.59E-01	50	3.19E-02