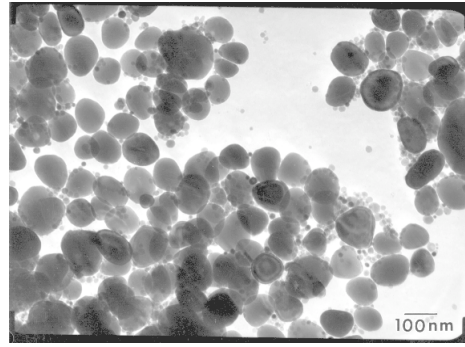
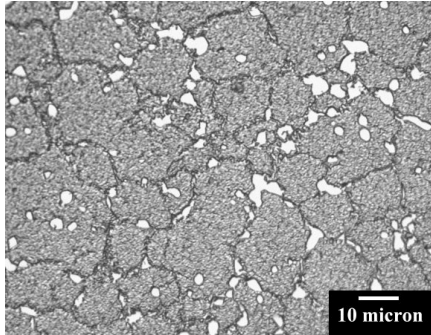


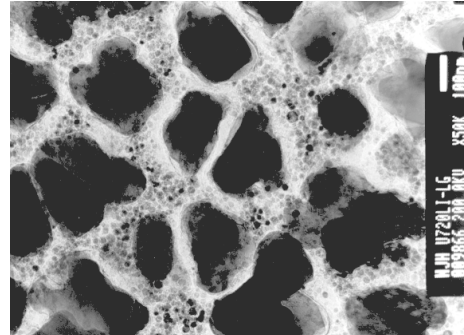
(a)



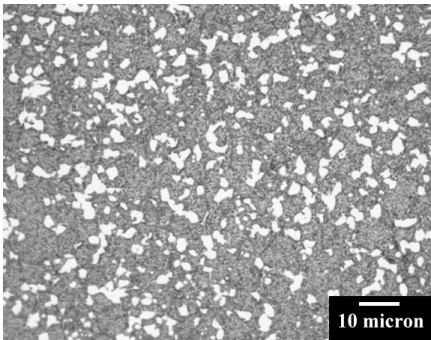
(b)



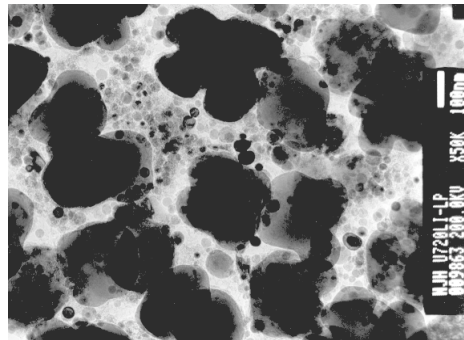
(c)



(d)



(e)



(f)

Figure 1: Microstructure of test materials (a) U720Li – orthophosphoric etch (b) U720Li – carbon extraction replica (c) U720Li-LG – orthophosphoric etch (d) U720Li-LG – carbon extraction replica (e) U720Li-LP – orthophosphoric etch (f) U720Li-LP – carbon extraction replica

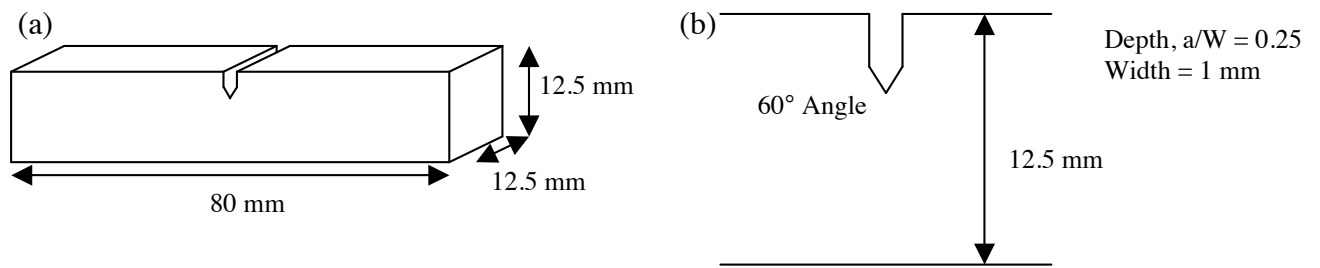


Figure 2: SENB specimen geometry used in long crack tests.

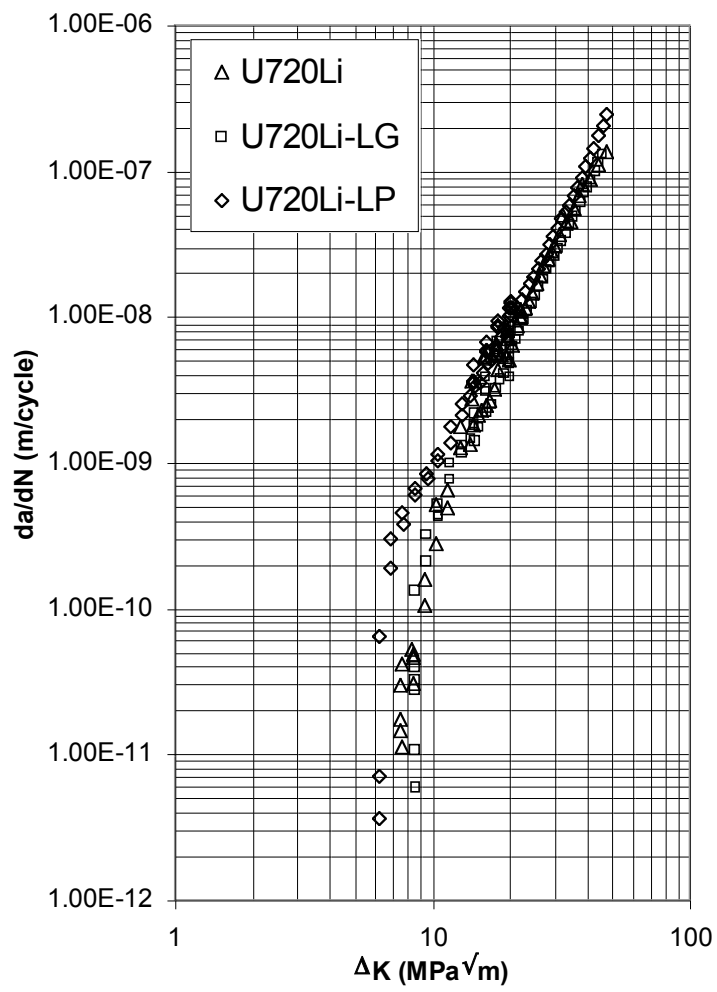


Figure 3: da/dN versus ΔK behaviour of all 3 alloys at room temperature.

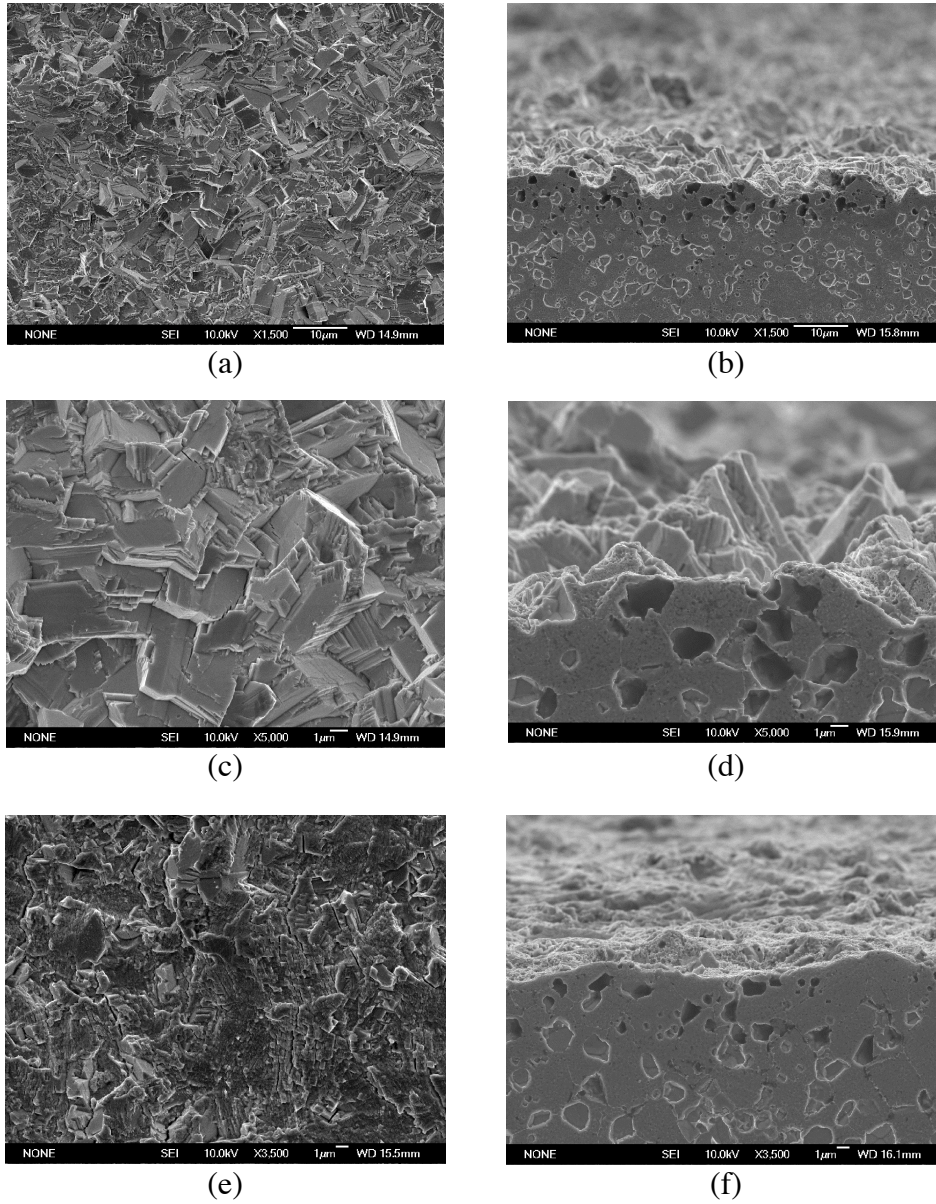
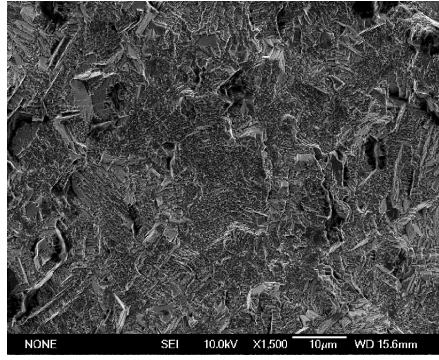
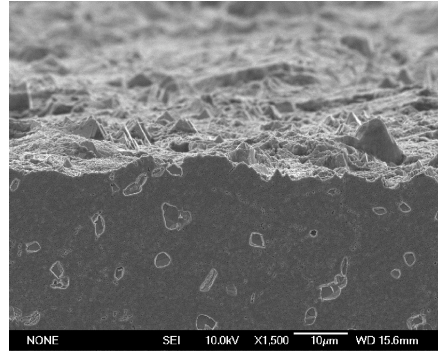


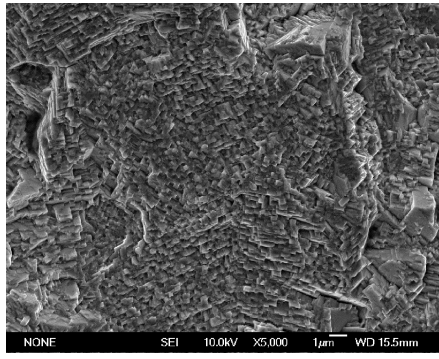
Figure 4: U720Li fractography: (a) Fracture surface near threshold at $\Delta K \approx 7.5$ MPa $\sqrt{\text{m}}$ (b) Section of fracture surface, showing crack path through microstructure at $\Delta K \approx 7.5$ MPa $\sqrt{\text{m}}$ (c) Close-up of (a) (d) Close-up of (b) (e) Fracture surface at $\Delta K \approx 25$ MPa $\sqrt{\text{m}}$ (f) Section of fracture surface, showing crack path through microstructure at $\Delta K \approx 23$ MPa $\sqrt{\text{m}}$



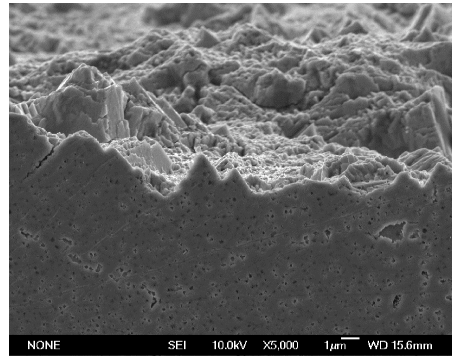
(a)



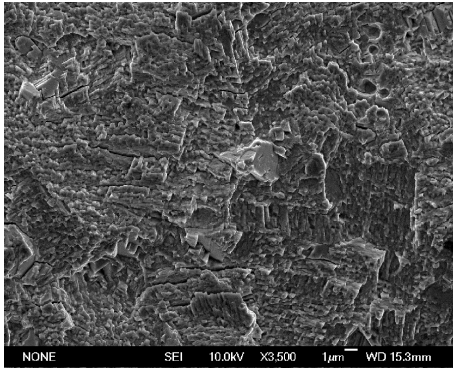
(b)



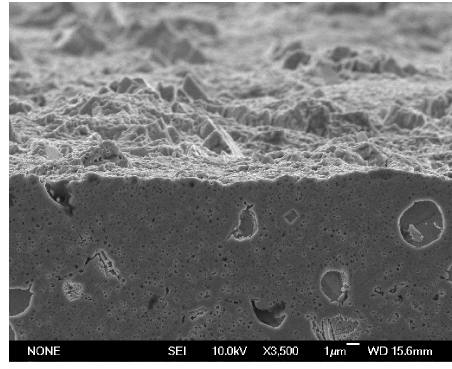
(c)



(d)



(e)



(f)

Figure 5: U720Li-LG fractography: (a) Fracture surface near threshold at $\Delta K \approx 8.5$ MPa \sqrt{m} (b) Section of fracture surface, showing crack path through microstructure at $\Delta K \approx 8.5$ MPa \sqrt{m} (c) Close-up of (a) (d) Close-up of (b) (e) Fracture surface at $\Delta K \approx 23$ MPa \sqrt{m} (f) Section of fracture surface, showing crack path through microstructure at $\Delta K \approx 23$ MPa \sqrt{m}

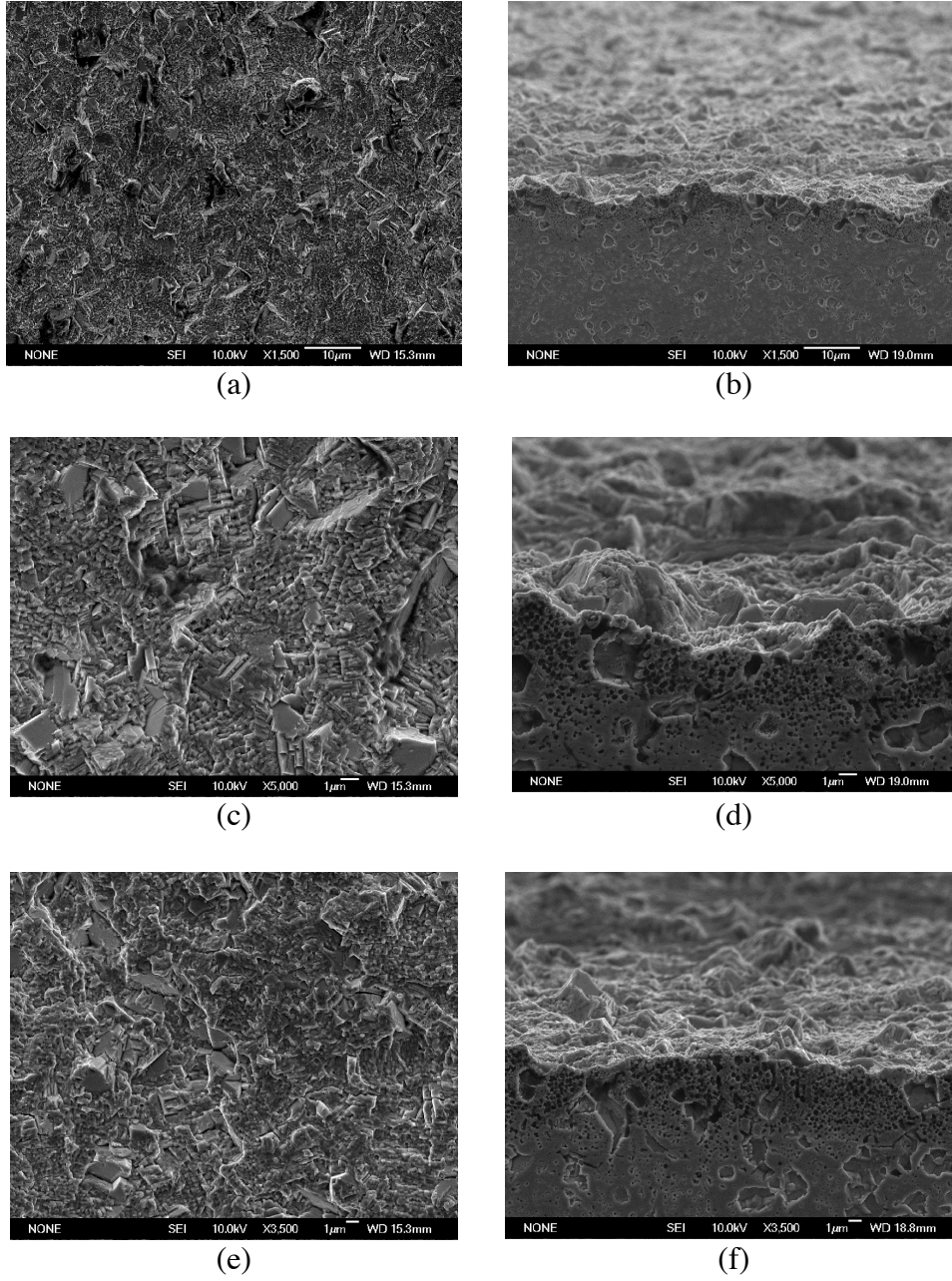


Figure 6: U720Li-LP fractography: (a) Fracture surface near threshold at $\Delta K \approx 6$ MPa $\sqrt{\text{m}}$ (b) Section of fracture surface, showing crack path through microstructure at $\Delta K \approx 6$ MPa $\sqrt{\text{m}}$ (c) Close-up of (a) (d) Close-up of (b) (e) Fracture surface at $\Delta K \approx 24$ MPa $\sqrt{\text{m}}$ (f) Section of fracture surface, showing crack path through microstructure at $\Delta K \approx 22$ MPa $\sqrt{\text{m}}$

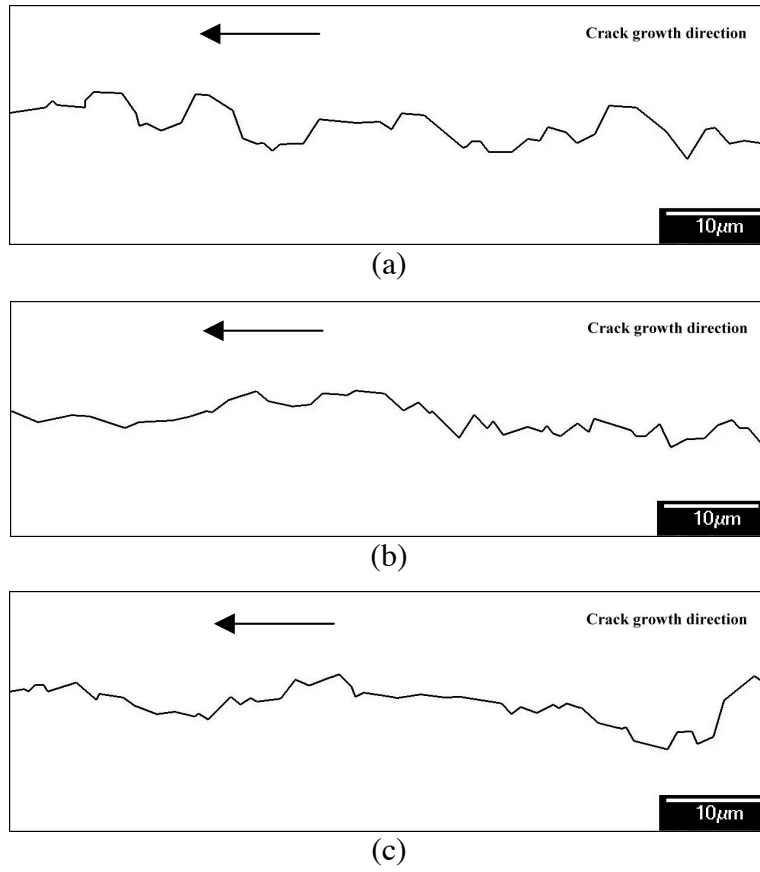
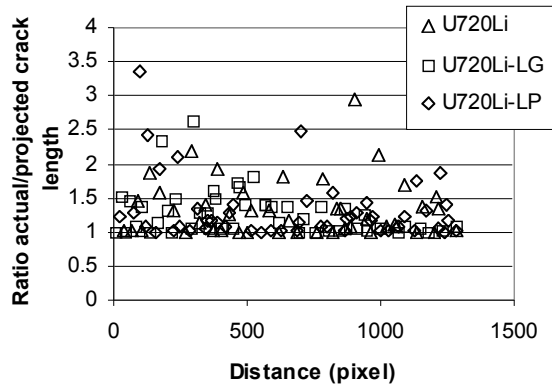
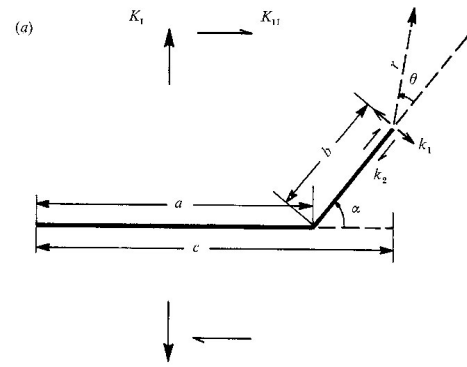


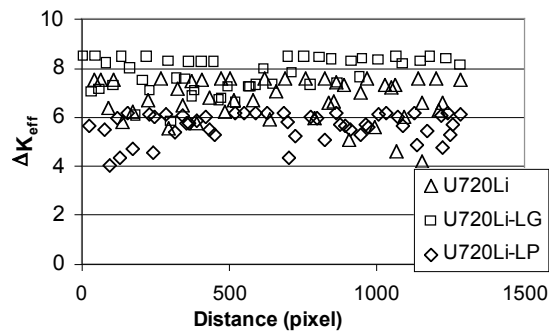
Figure 6: Crack profile at near-threshold ΔK (a) U720Li (b) U720Li-LG (c) U720Li-LP



(a)



(b)



(c)

Figure 7: Crack deflection measurements: (a) Actual/projected crack length (b) Schematic representation of a deflected crack geometry (c) Local ΔK_{eff} variation due to crack deflection.

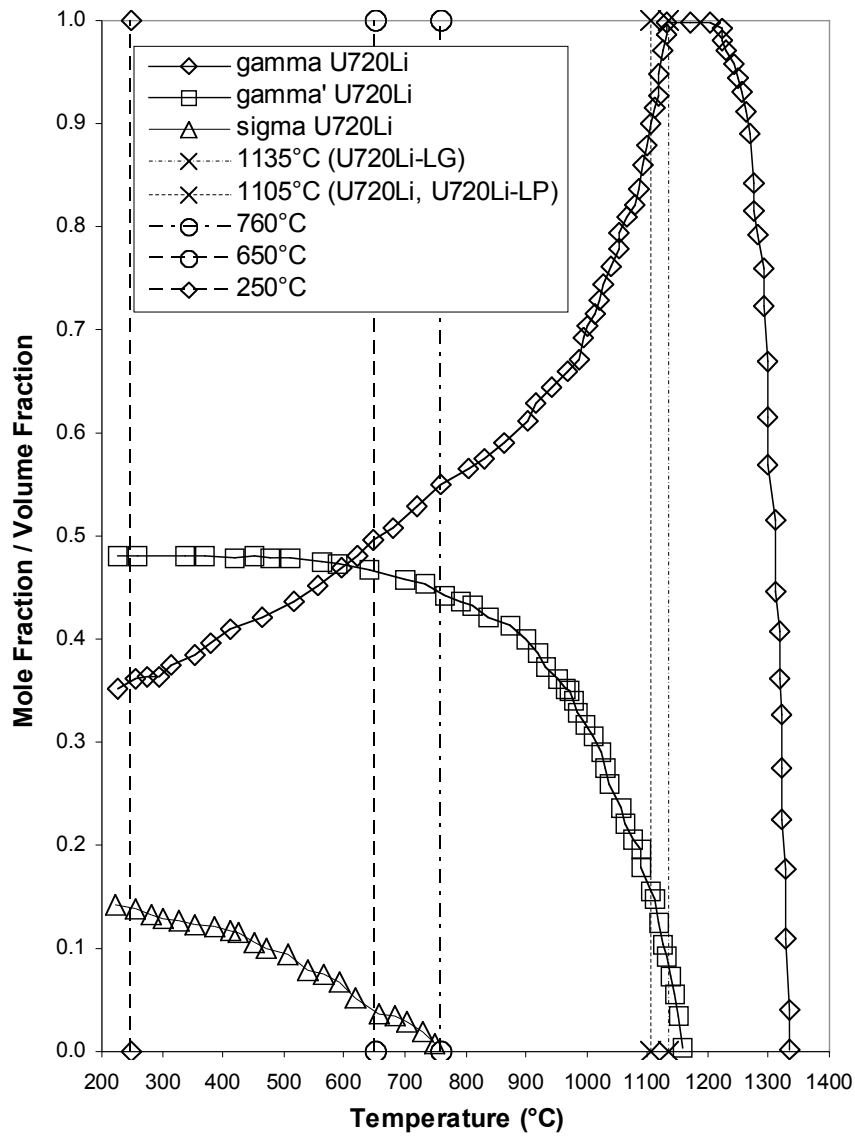
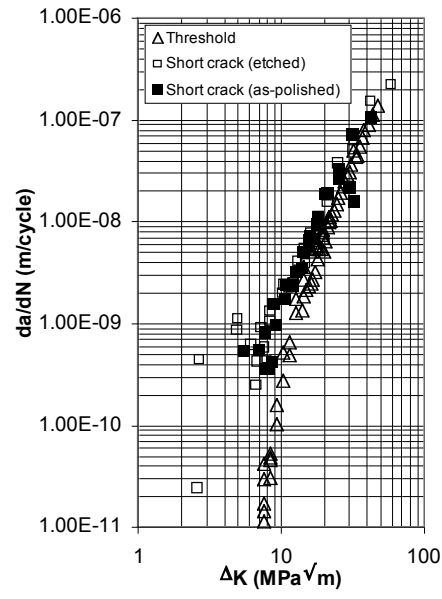
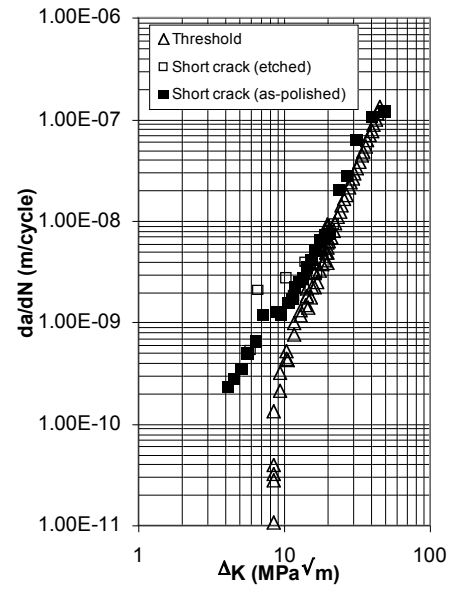


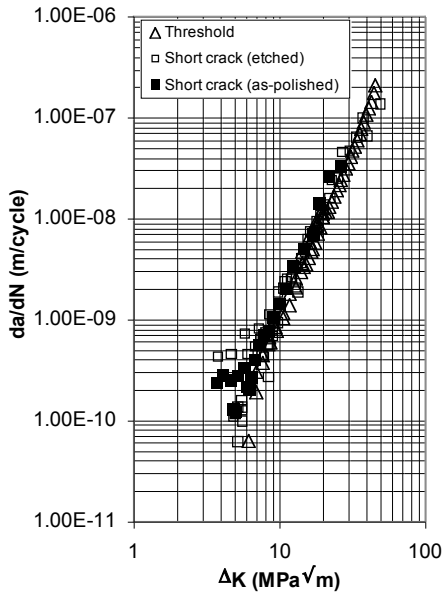
Figure 9: Thermo-calc prediction of phase distribution for U720Li (Cantab ref).



(a)

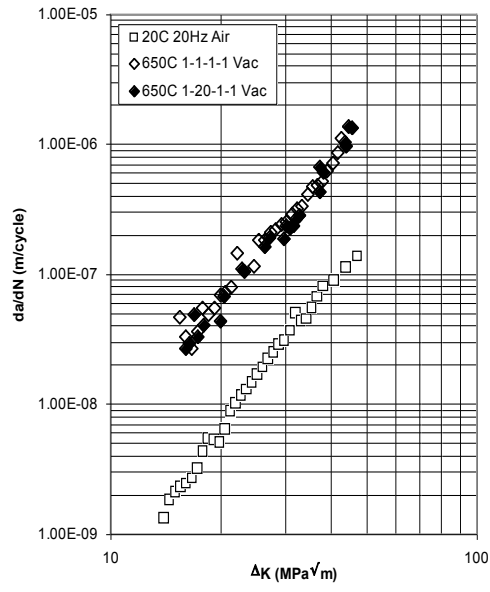


(b)

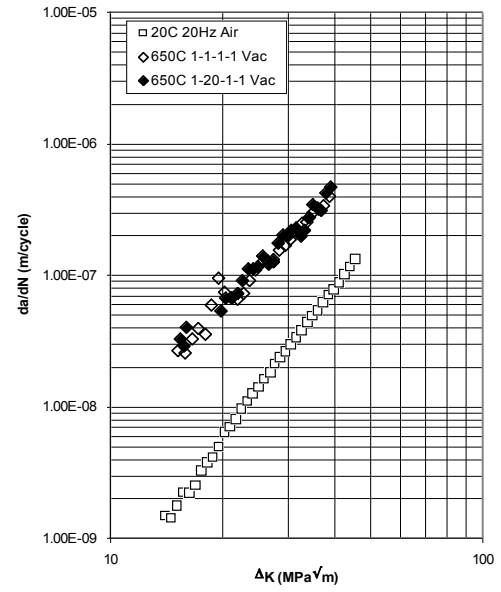


(c)

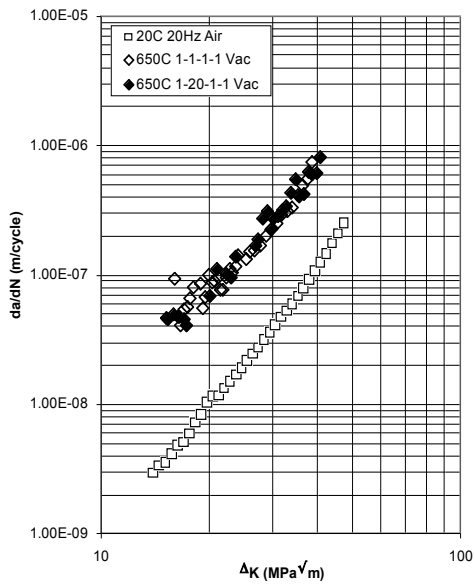
Figure 10: Room temperature long crack-short crack comparison (a) U720Li (b) U720Li-LG (c) U720Li-LP



(a)



(b)



(c)

Figure 11: Room temperature vs. 650°C long crack growth comparison (a) U720Li (b) U720Li-LG (c) U720Li-LP