Research topics

- **Mg alloys superplastic defofromation and cavity evaluation at elevated temperatures**
- **Friction stir processing(FSP) to fabricate Mg based alloys nano-composites**
- **Texture research of FSP Mg alloys**
- **Micro-compression of bulk metallic glasses(BMG) by focus ion beam(FIB) and nano-indentation system**

Cavity evaluation of Mg alloys at elevated temperatures

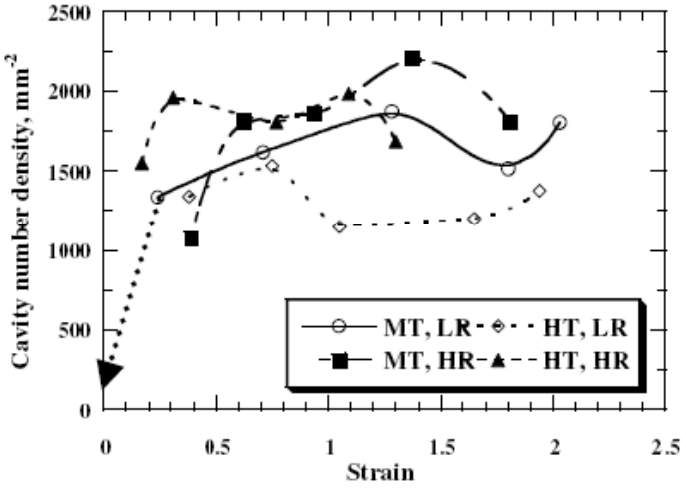


Fig. 6. Variation of the cavity number density as a function of tensile strain for the AZ31 specimens loaded at different conditions. The dotted and arrowed line is referred to the postulated trend for the initial rapid cavity nucleation.

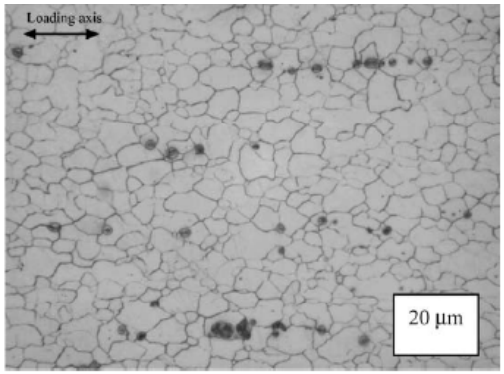


Fig. 11. OM micrograph showing the cavity locations in the etched AZ31 specimen loaded at 400 °C and 1×10^{-2} s^{-1} to a true strain of ~1.1.

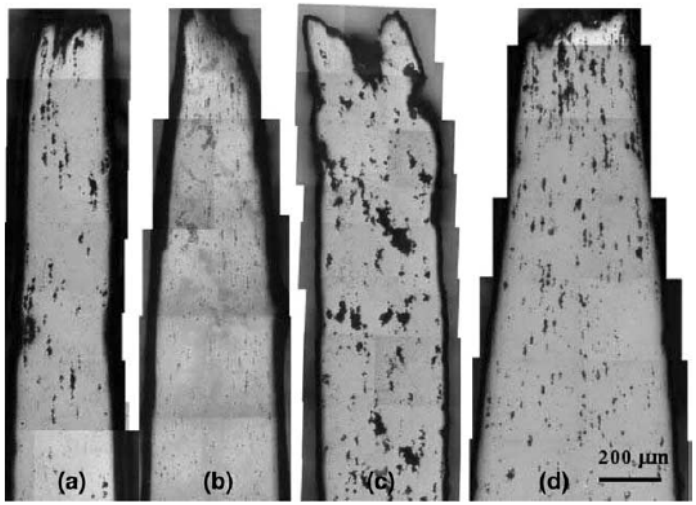


Fig. 10. Low magnification OM micrographs for the fracture tip sections in the AZ31 specimens loaded at: (a) 300 °C (MT) and 6×10^{-4} s^{-1} (LR), (b) 300 °C (MT) and 1×10^{-2} s^{-1} (HR), (c) 400 °C (HT) and 6×10^{-4} s^{-1} (LR), and (d) 400 °C (HT) and 1×10^{-2} s^{-1} (HR).

Ref: C. J. Lee and J. C. Huang, Acta Mater., vol. 52 (2004), pp. 3111-3122

FSP to fabricate Mg based nano composites

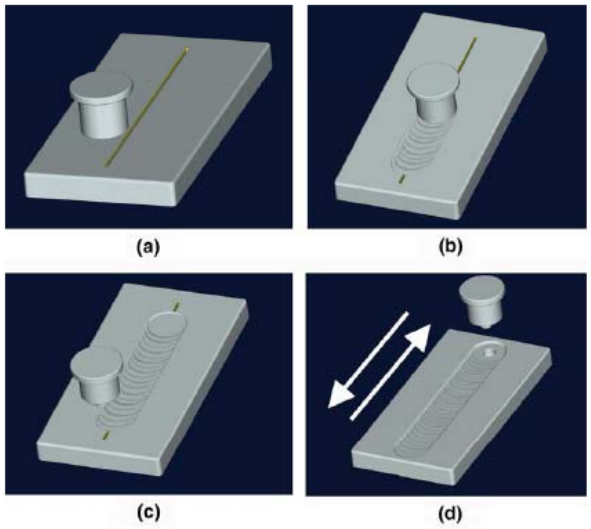
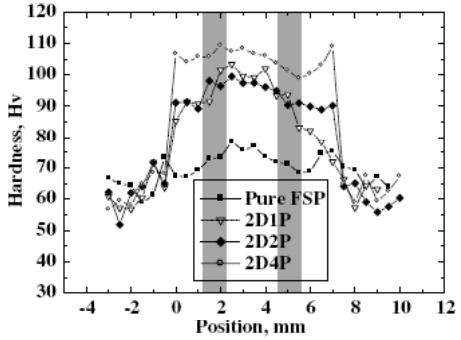
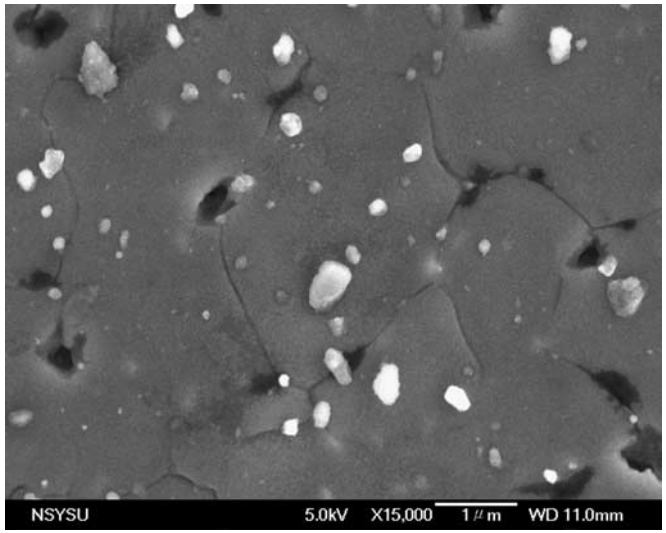


Fig. 2. The FSP procedure: (a) cutting groove(s) and inserting SiO_2 particles; (b) using a flat tool to undertake the surface repair; (c) applying a tool with a fixed pin to undertake the FSP; and (d) conducting multiple FSP passes.

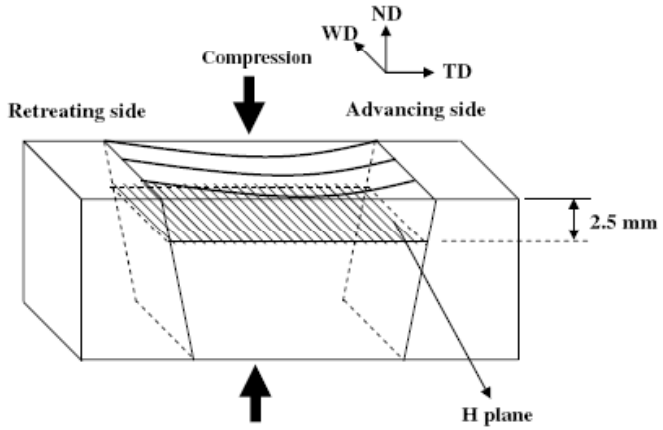


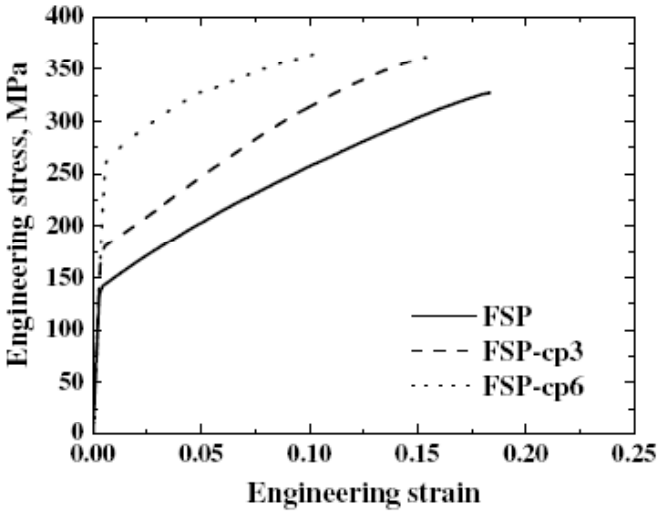


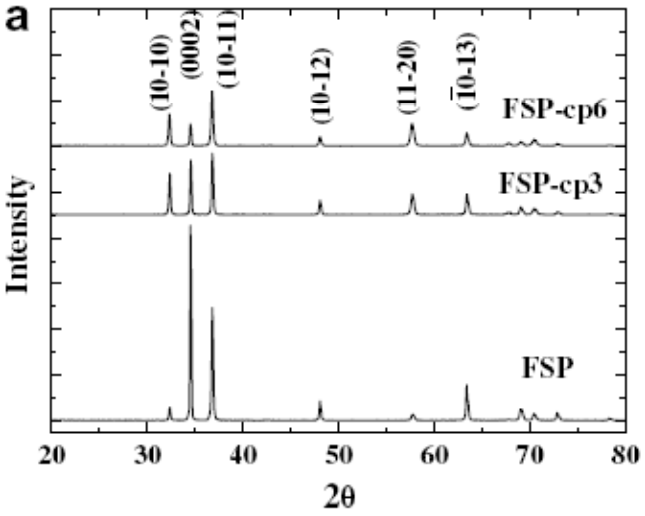
SEM photography of Mg based composite

Ref: C. J. Lee, J. C. Huang and P. J. Hsieh, Scripta Mater., vol. 54 (2006), pp. 1415-1420

Texture research of FSP Mg alloys



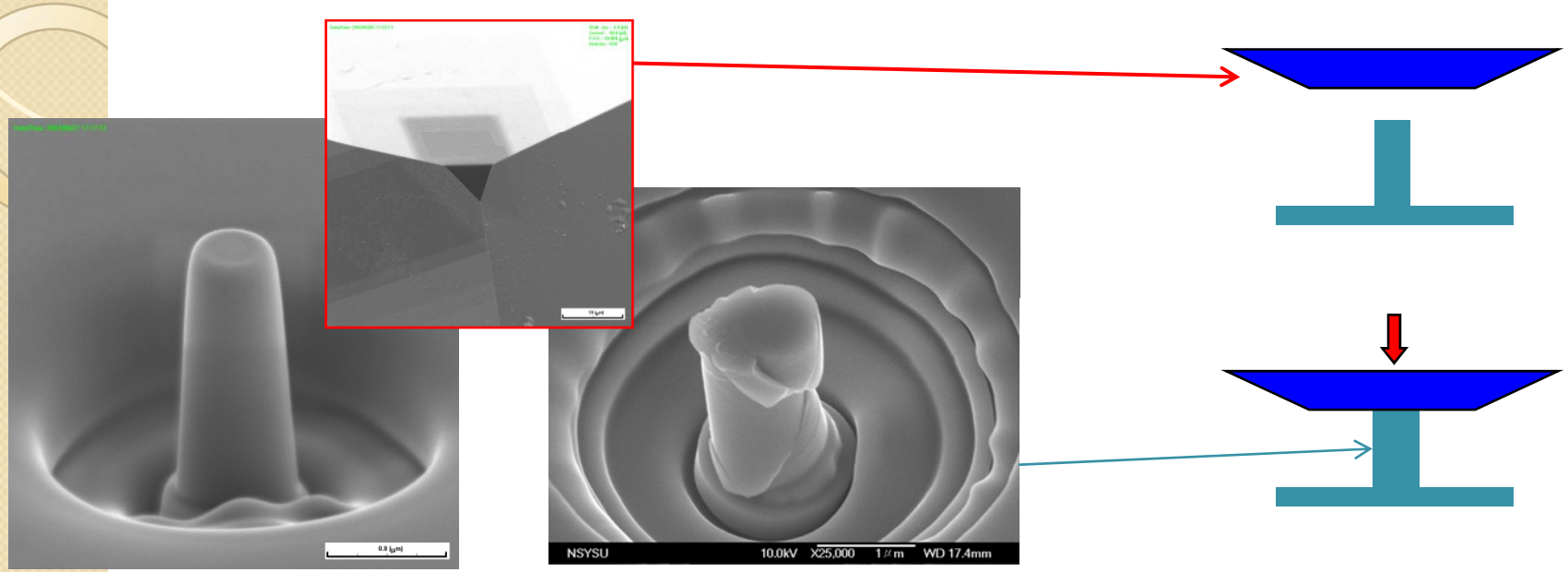


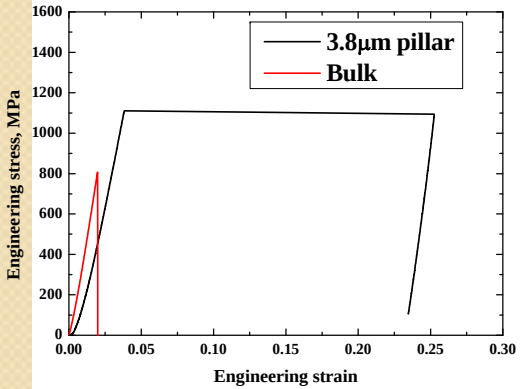


XRD measure from the T plane

Ref: C. J. Lee, J. C. Huang and X. H. Du, Scripta Mater., vol. 56 (2007), pp. 875-878

Micro-compression test





Ref: C. J. Lee, J. C. Huang and T. G. Nieh, Appl. Phys. Lett., vol. 91 (2007), pp. 161913

Future interesting topics

- **By lithography to fabricate the micro bridge and cantilever beam of thin film**
- **Study the mechanical properties of micro samples**
- **High reflectivity Al plates or foil**