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### **Role of Yttrium in Glass Formation of Bulk Metallic Glasses**

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It was found experimentally that appropriate additions of yttrium in both Fe-based and Zr-based bulk metallic glasses can improve their glass-forming ability (GFA) dramatically<sup>1,2</sup>. In this talk, focuses will be placed on understanding the beneficial effects of yttrium on glass formation in these alloy systems. Our studies indicated that the striking enhancement of the GFA in these systems is attributed to two factors:

1. Yttrium additions can successfully suppress the formation of competing crystalline phases, thus adjusting the composition to be closer to the eutectic and lowering the liquidus temperatures of the alloys (i.e., destabilizing the competing crystalline phases).
2. Yttrium can also scavenge oxygen to form innocuous yttrium oxides from the undercooled liquid, thereby stabilizing the liquid phase.

The current work demonstrates clearly that the GFA of bulk metallic glasses can be increased by either enhancing the liquid phase stability or suppressing the formation of competing crystalline phases, which further confirms and verifies our previous analysis<sup>3</sup>.

[1]. Z. P. Lu & C. T. Liu, Phys. Rev. Lett., 92(2004)245503.

[2]. Z. P. Lu et al, Appl. Phys. Lett., 83(2003)2581.

[3]. Z. P. Lu & C. T. Liu, Phys. Rev. Lett., 91(2003)115505.

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