

Introduction of Recent Work

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□ Research areas

- Bulk metallic glasses (BMGs)
- Thin film metallic glasses (TFMGs)
- Microscale mechanical properties on TFMGs

□ Interesting topics

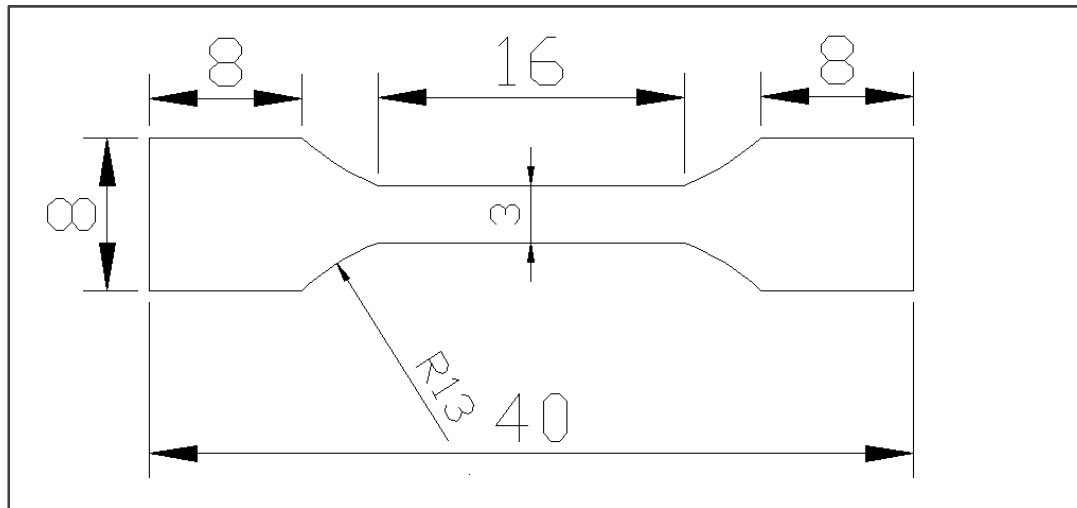
- Ductility of Zr-based and Pd-based TFMGs
- Fatigue-resistance enhancements by TFMGs coating on aluminum alloys used in aerospace industries
- Microscale fatigue characteristics on TFMGs

TFMGs samples preparation

- **Materials of thin films**
 - **Binary: $Zr_{45}Cu_{55}$**
 - **Ternary: Pd-based material**
 - **Quaternary: Zr-based two-glassy-phase material**
- **Substrates**
 - **Main substrates:**
 - **Cu foils with different thickness**
 - **Comparison:**
 - **Si wafer**
 - **Aluminum alloys used for the aerospace industries**

TFMGs samples preparation

- Mechanical tests of microscale TFMGs
 - Tensile test
 - 3-point-bend test
 - Fatigue test
- Sample size (for the tensile test)



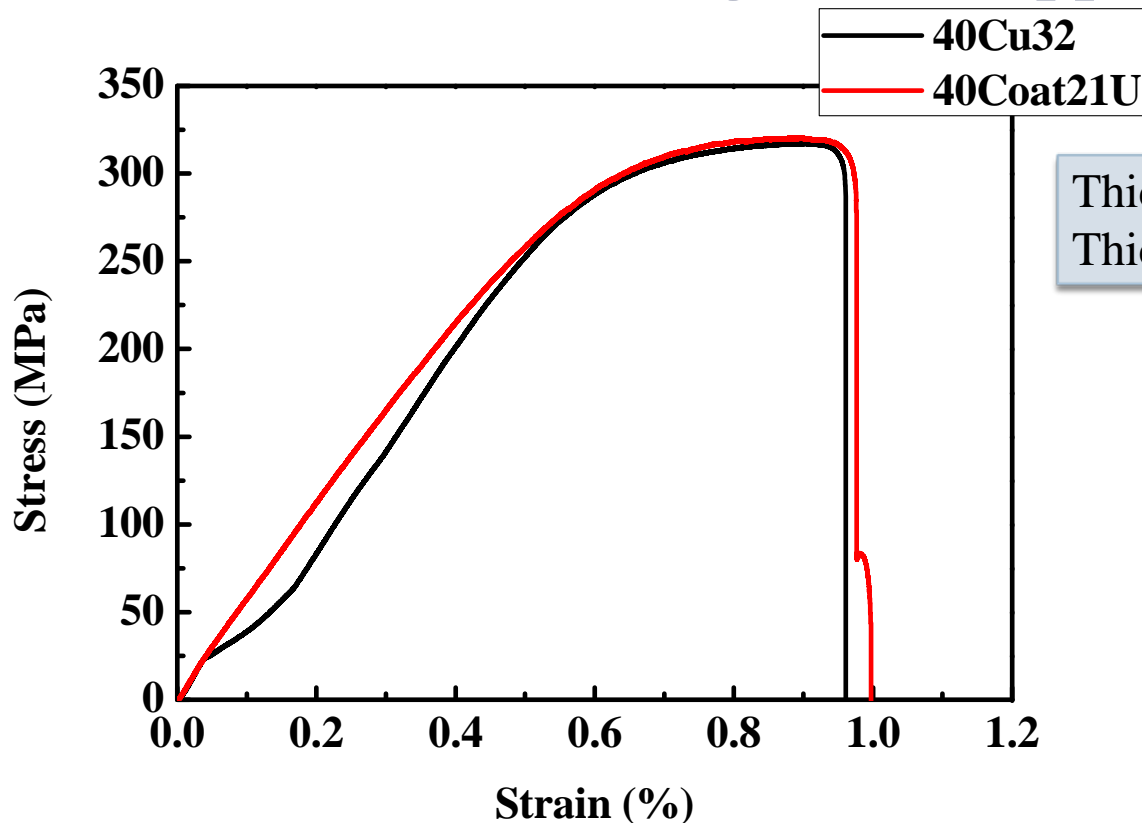
(unit: mm)

Preliminary result: tensile test

□ Comparison

▣ Pure copper foil: 40Cu32

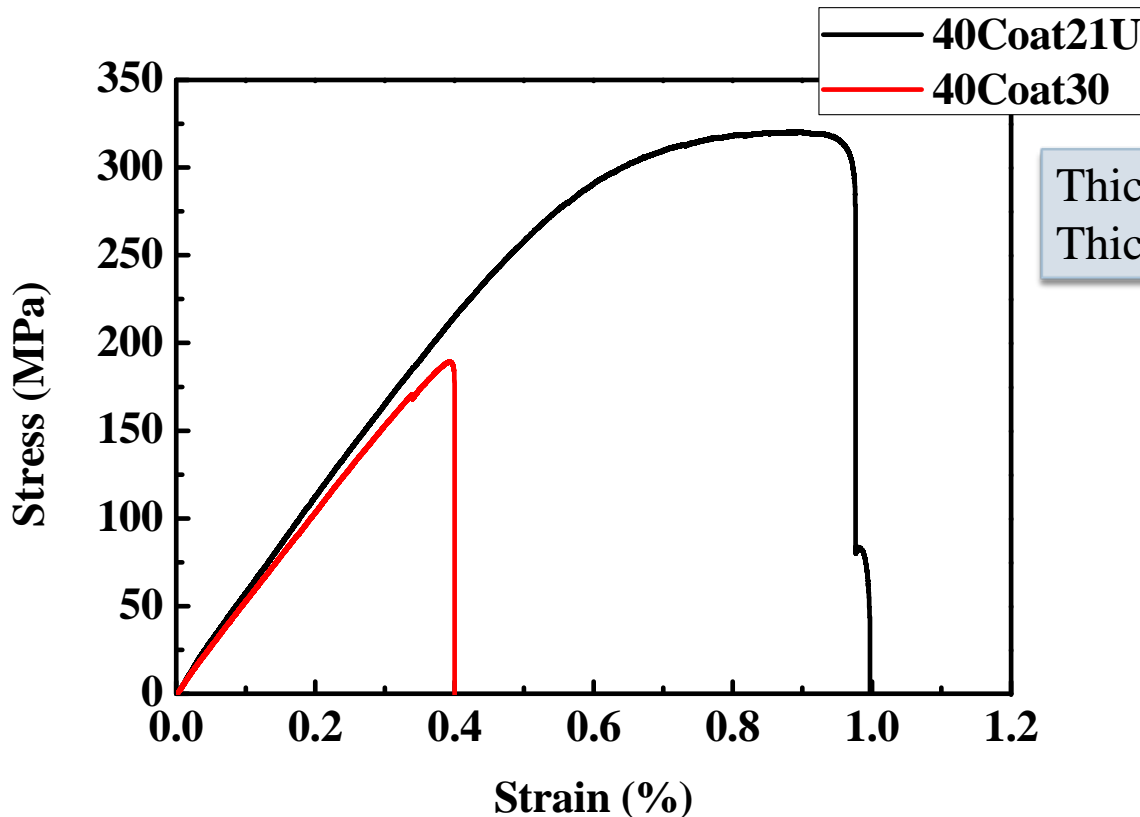
▣ Zr-Cu TFMGs coating on the copper foil: 40Coat21U



Thickness of Cu foils: 0.05 mm
Thickness of TFMGs: 0.00171 mm

Preliminary result: tensile test

- Comparison after tensile test
 - ▣ Coating sample with pre-notch: 40Coat30
 - ▣ Coating sample without pre-notch: 40Coat21U

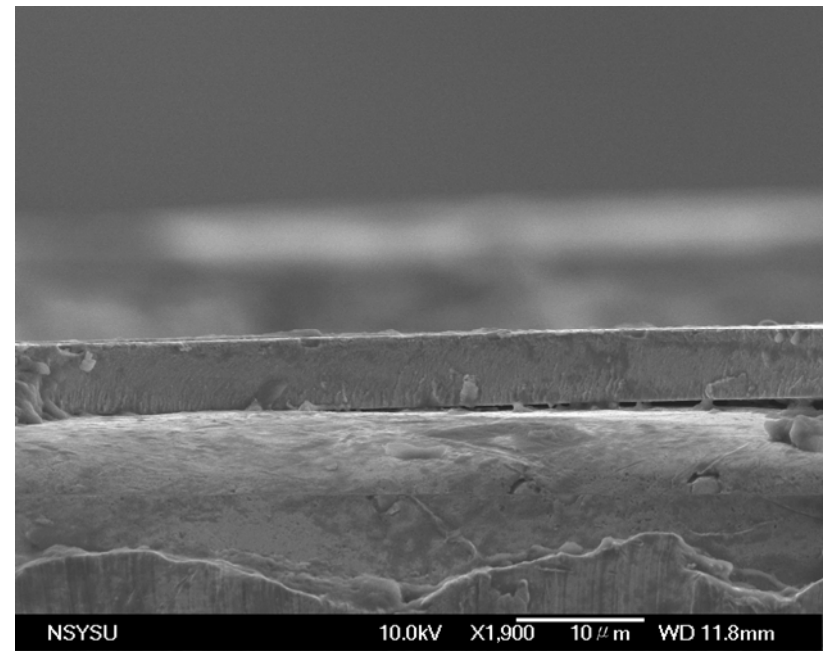
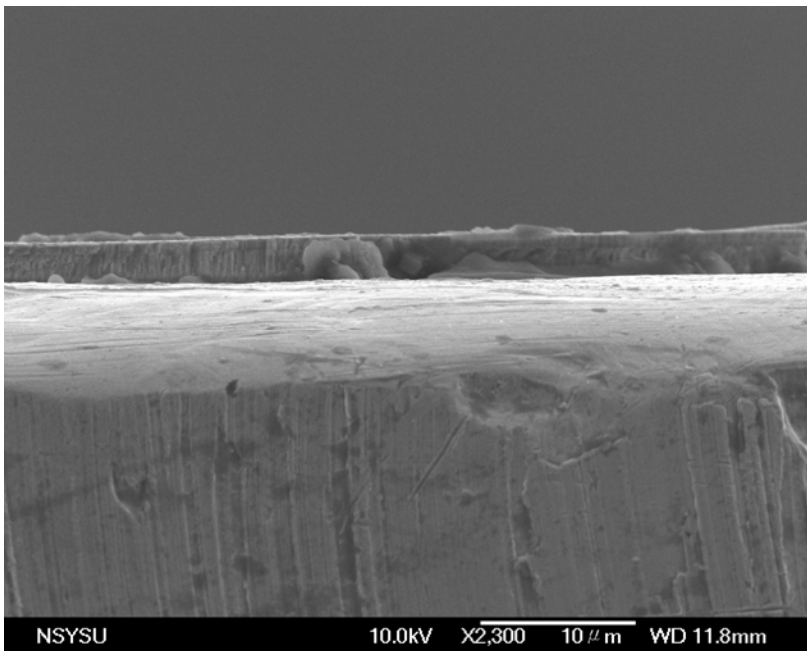


Thickness of Cu foils: 0.05 mm
Thickness of TMFGs: 0.00171 mm

Preliminary result: SEM analysis

□ Before tensile test

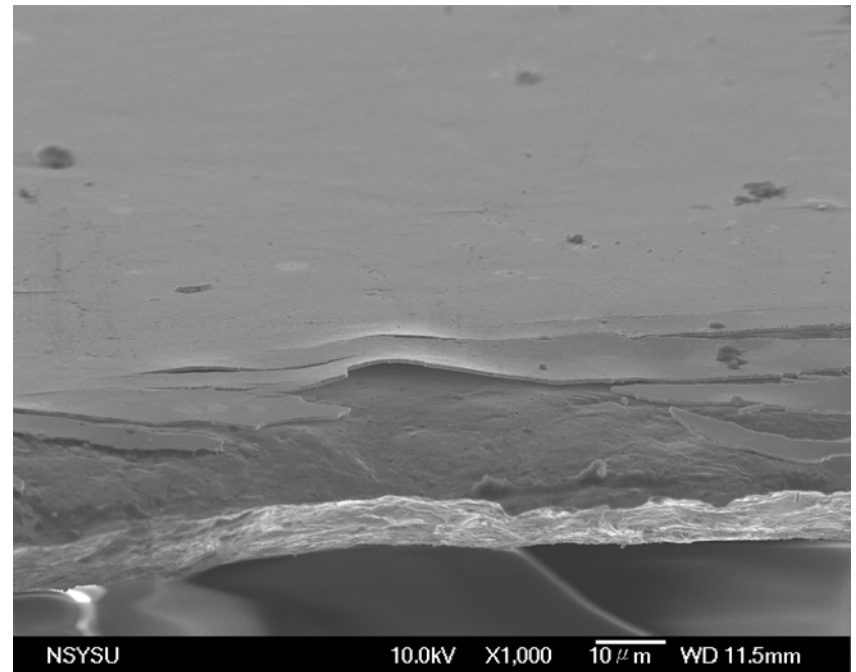
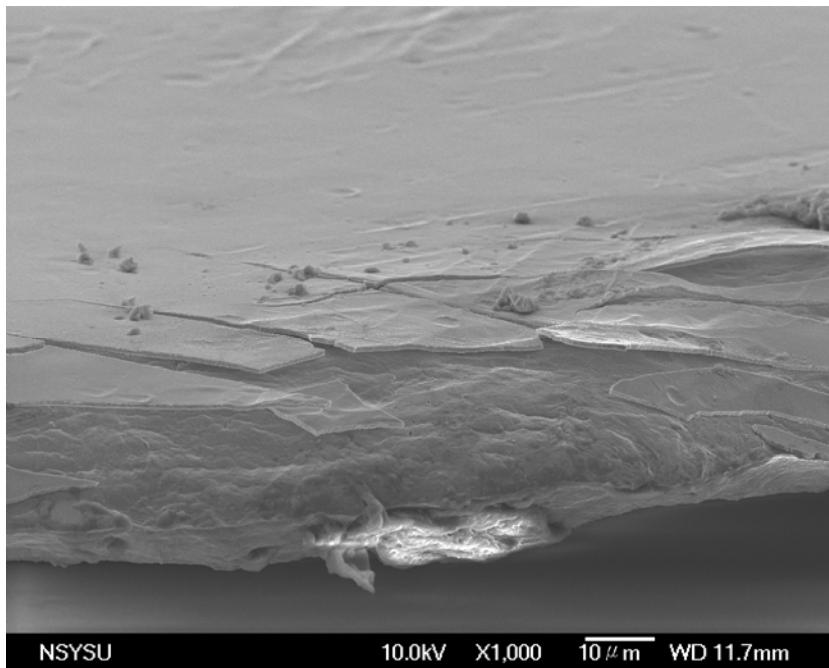
- The cross-section of the coating sample just after cutting by knife.



Thickness of Cu foils: 0.05 mm
Thickness of TMFGs: 0.00171 mm

Preliminary result: SEM analysis

- **After tensile test**
 - ▣ The cross-section figures of the coating sample after tensile test.



Thickness of Cu foils: 0.05 mm
Thickness of TMFGs: 0.00171 mm



Thanks for your attention!!