



**COLD CONSOLIDATION
OF THE AMORPHOUS NI-ZR-TI RIBBONS
BY HIGH PRESSURE TORTION**

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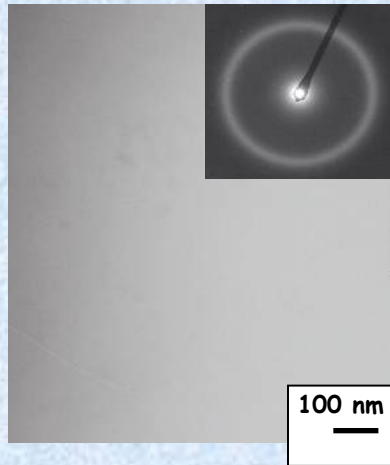
**Third Marie Curie Summer Schools,
Estremoz 2007**

The research material



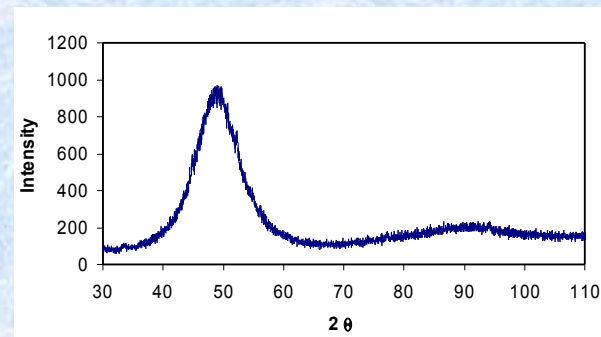
The melt-spun ribbon
of the composition
 $(\text{Ni}_{56}\text{Cu}_2)\text{Zr}_{18}\text{Ti}_{16}\text{Al}_3\text{Si}_5$

TEM microstructure



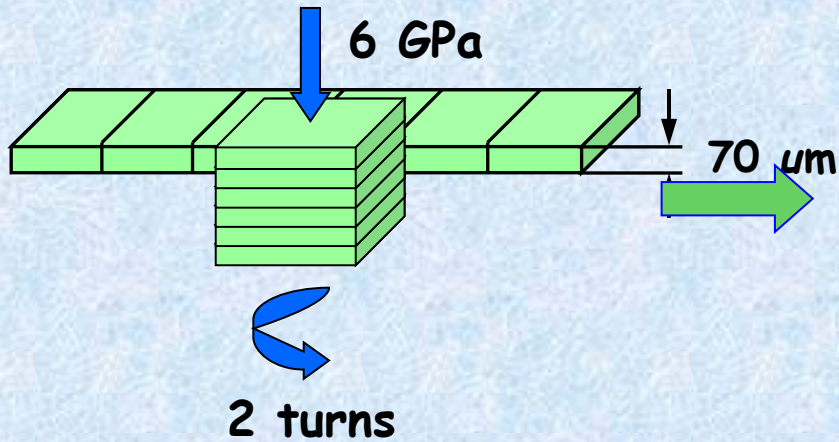
and

X-ray pattern of the melt-spun ribbon



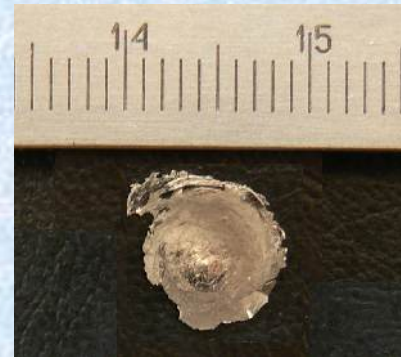
Cold consolidation by high pressure torsion (HPT)

The scheme of HPT

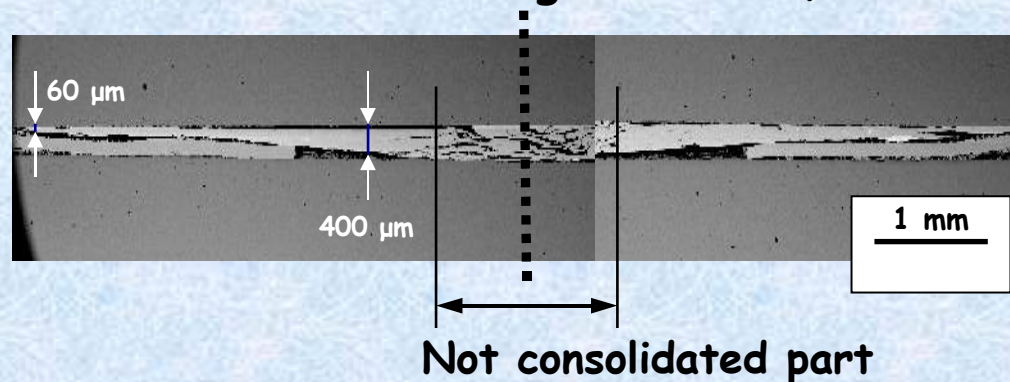


the room temperature

Cold consolidated sample (CCS)

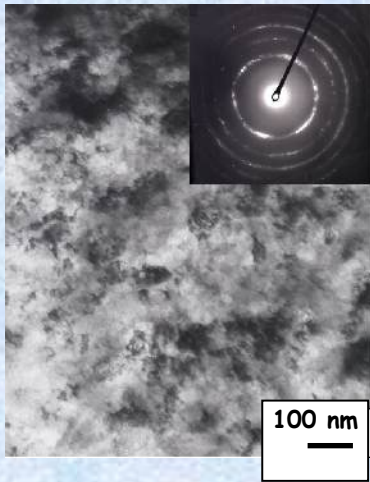


Cross-section through the CCS, SEM



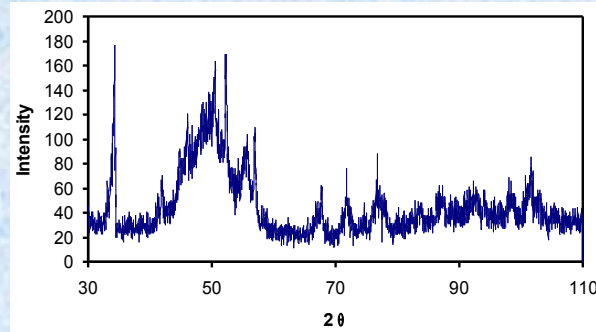
$$\varepsilon = \ln \left(1 + \left(\frac{\varphi \cdot R}{h} \right)_{iR}^2 \right)^{\frac{1}{2}} \approx 4.0 - \text{necessary strain for full consolidation}$$

TEM microstructure

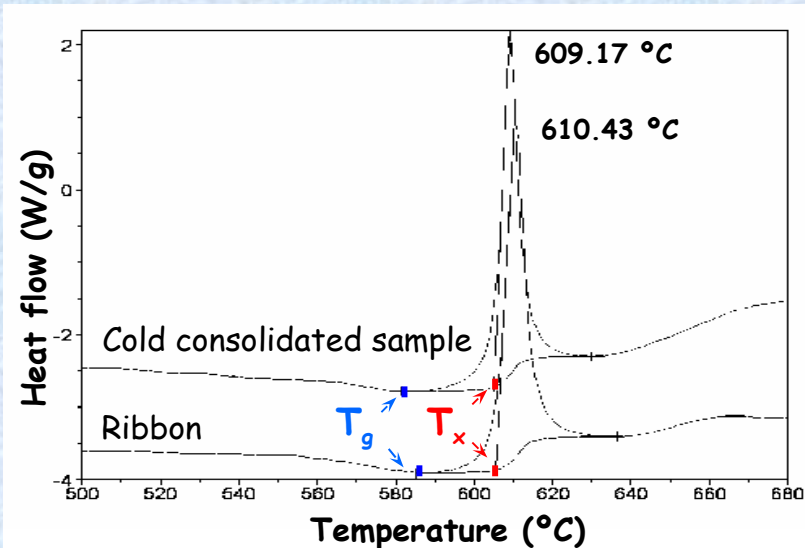


and

X-ray pattern of the CCS



The DSC curves comparing thermal stability of the ribbon and CCS



Samples	T_g , [°C]	T_x , [°C]	ΔT	ΔH_c of PC, [J/g]
Ribbon	572	605.4	33,4	64.6
CCS	576	605.0	29,0	58.4

T_g - the glass transition temperature;
 T_x - the primary crystallization temperature;
 ΔT - the thermal stability;
 ΔH_c - the enthalpy of primary crystallization.

The next steps ...

- ❖ **Determination of optimal conditions for full consolidation**
- ❖ **Measurements of mechanical properties**
- ❖ **Study of the thermal stability depends on the compositions**

Many thanks for your
attention!