Crystallization of the $Mg_{80}Ni_{10}CeMM_{10}$ and $Mg_{80}Ni_{10}Y_5CeMM_5$ amorphous alloys

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Applications

-Magnesium alloys are used for automotive and aerospace components due to its high specific strength.

→ fuel ↓ → CO_2 ↓

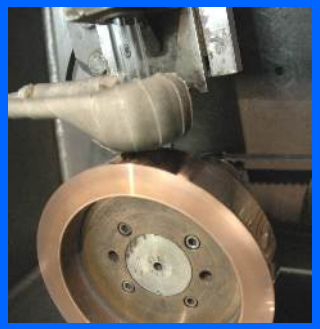
Mg-based amorphous alloys:

- Hydrogen storage materials.

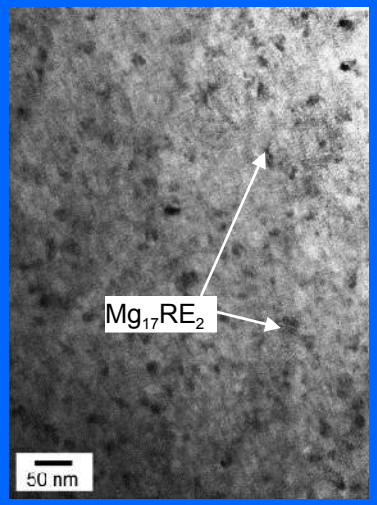
- Structural materials.

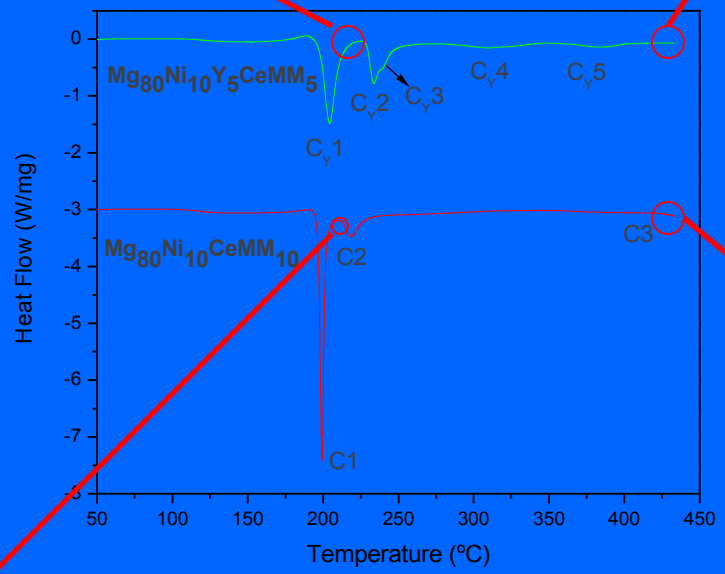
-Addition of TM (Ni, Cu or Zn), Y and/or RE elements in certain proportions to pure magnesium stabilize the amorphous structure when it is cooled quickly enough.

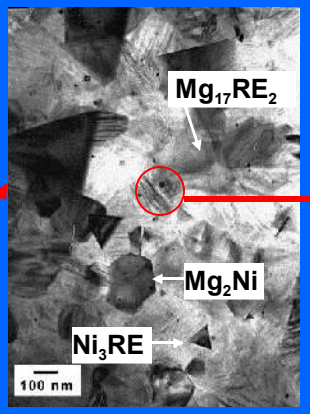
Melt-spinning

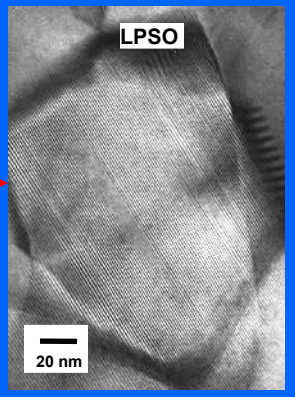


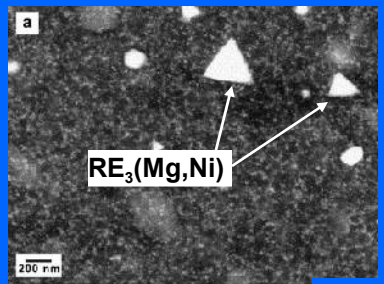
Crystallization

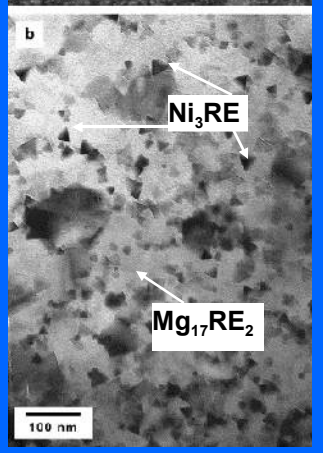


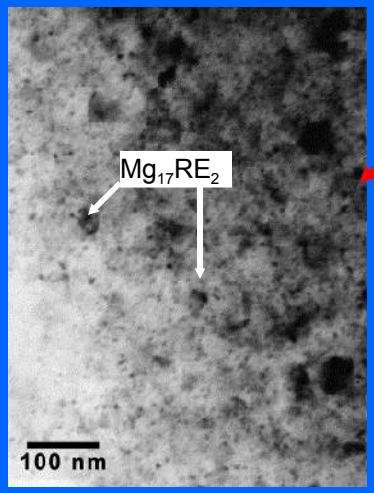












Conclusions

-Crystallization of the two alloys takes place in several steps.

-Crystallization of both alloys gives rise to a nanocrystalline matrix of $Mg_{17}RE_2$ embedding other intermetallics phases.

-The substitution of CeMM by Y shifts the crystallization temperature to higher temperatures. Therefore Y stabilizes the amorphous phase.

-During the crystallization of the alloy containing yttrium, the supersaturated magnesium nanocrystals adopt the configuration of a LPSO structure.

-The phase transformations that occur during the heating is the presence of phases supersaturated in different alloying elements.