Growth of Lanthanum Manganate (LMO) Buffer Layers on Ni(W) via a Metal-Organic Deposition Process

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Teamed with
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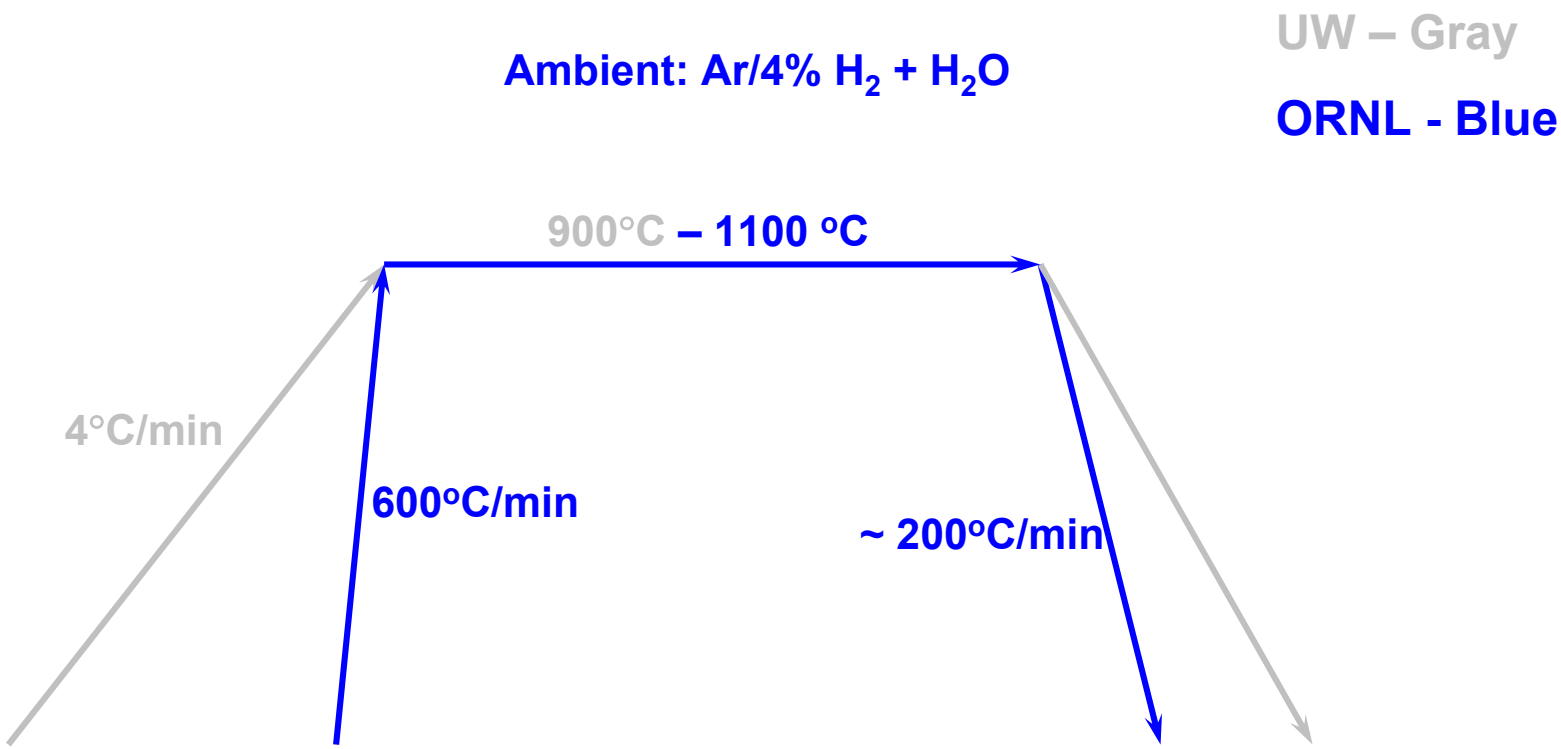
Different heating parameters between UW and ORNL



pO_2 and H_2/H_2O that prevent Ni(W) oxidation

F. Lu

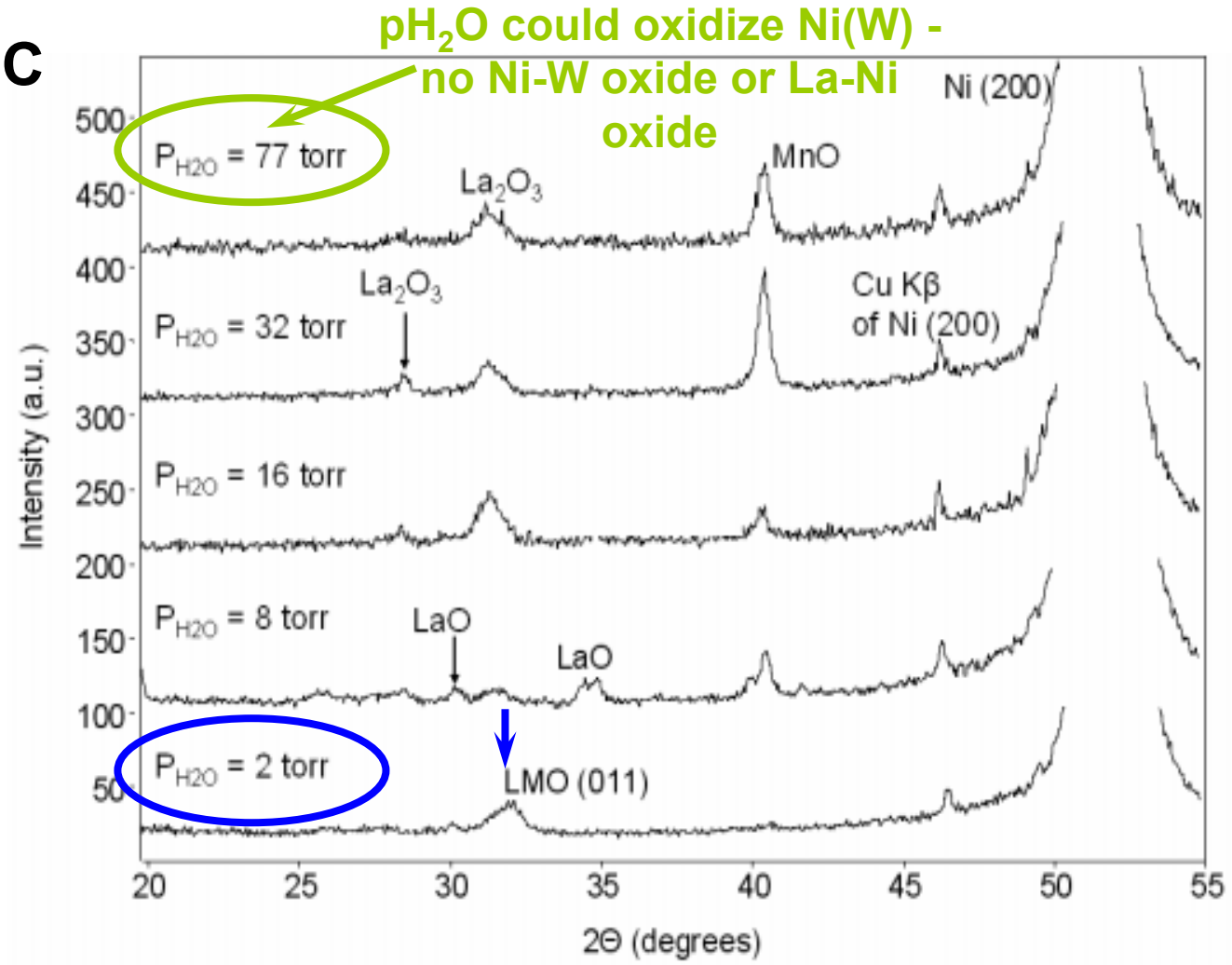
$$Ni + W + 2O_2 = NiWO_4$$

@ T = 900ºC $p_{O_2} \leq 2.9 \times 10^{-16}$ to 6.3×10^{-16} atm

For Ar/4%H_2 $\Rightarrow$ pH_2O max $\approx$ 64 torr

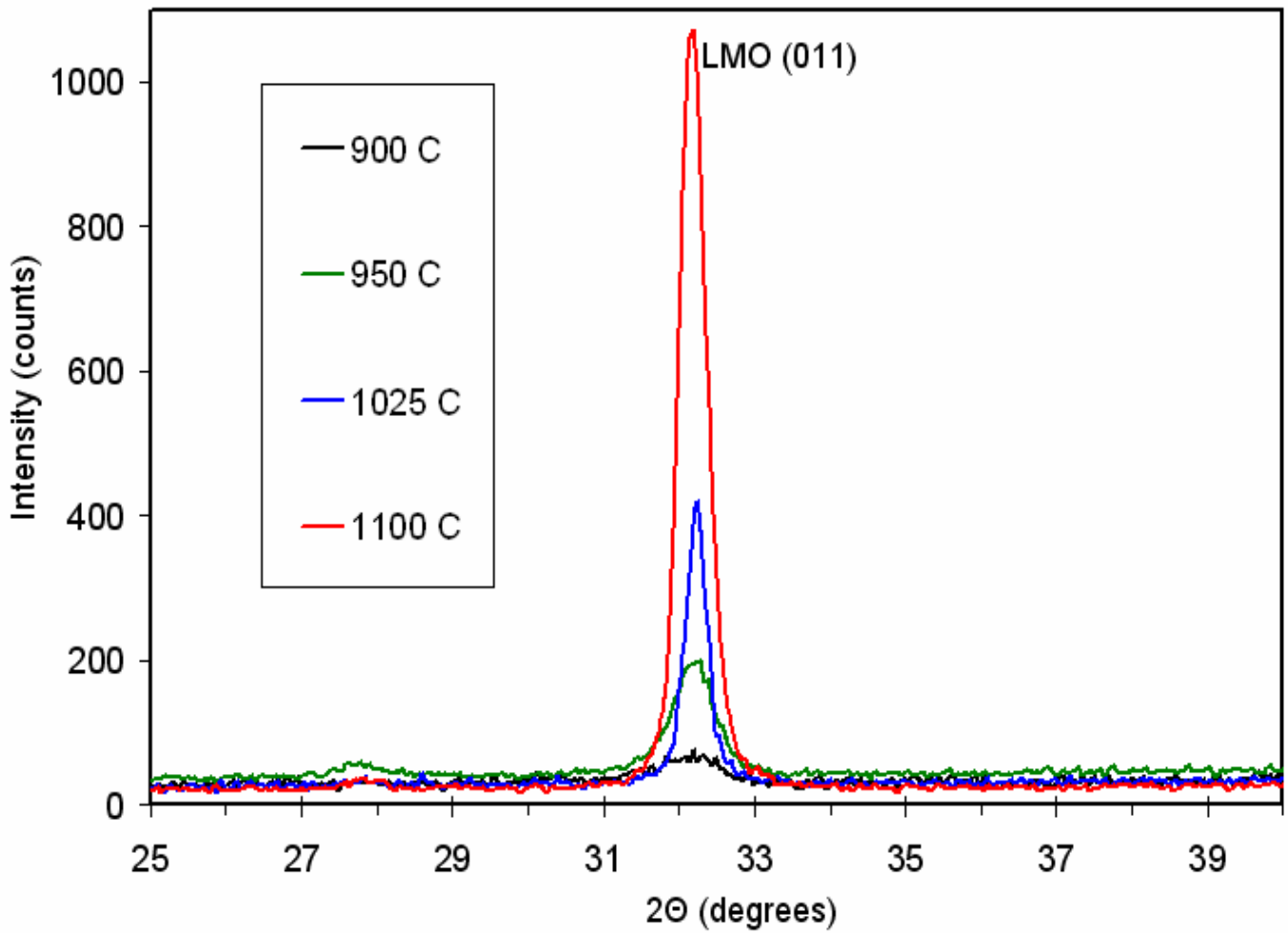
Varying pH_2O – LMO forms at 2 torr H_2O

900°C



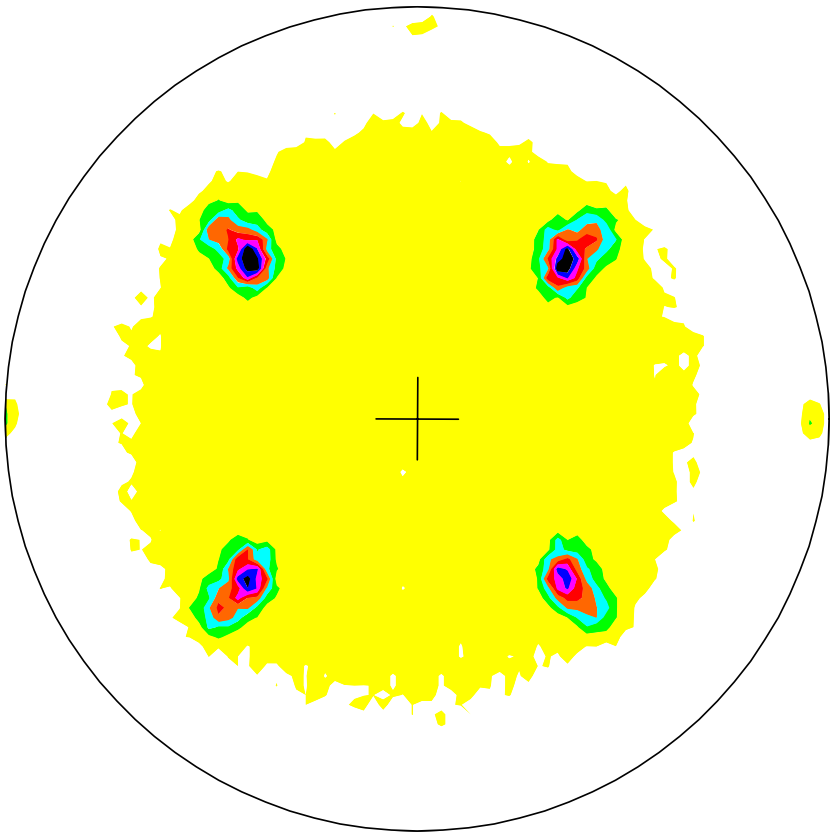
Increasing T_{max} improves LMO epitaxy

pH_2O = 2 torr

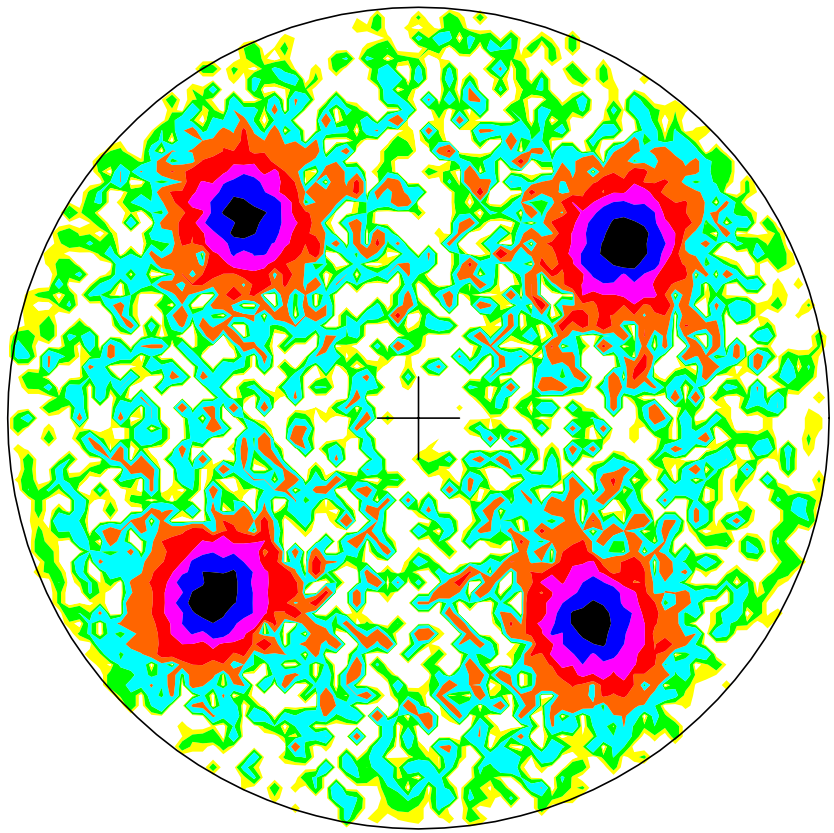


Pole figures shows good texture

LMO



YBCO/CeO_2/LMO/Ni(W)



Summary

- LMO can be deposited on bare Ni(W)
- LMO forms in a narrow pH_2O window
  - 1 torr < pH_2O < 2 torr
- Higher deposition temperature yields higher epitaxy