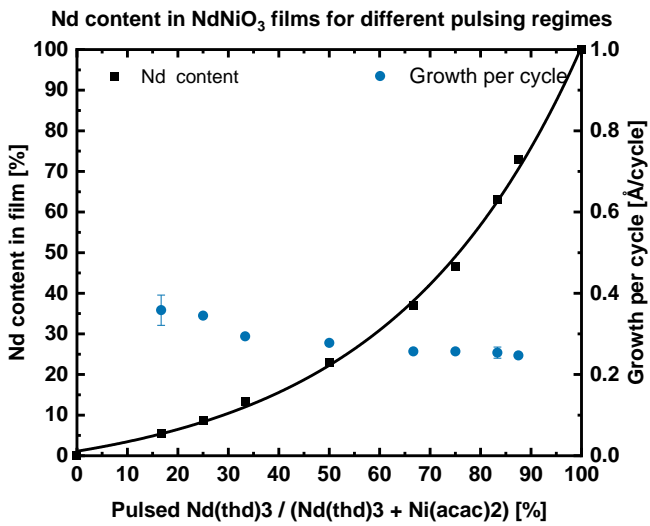


Phase diagram for the rare-earth nickelates.

Shows the electronic, magnetic and structural transitions at temperatures parametrized by the tolerance factor (bottom axis) and Ni-O-Ni bond angle (top axis), both dependent on the rare-earth cation size.

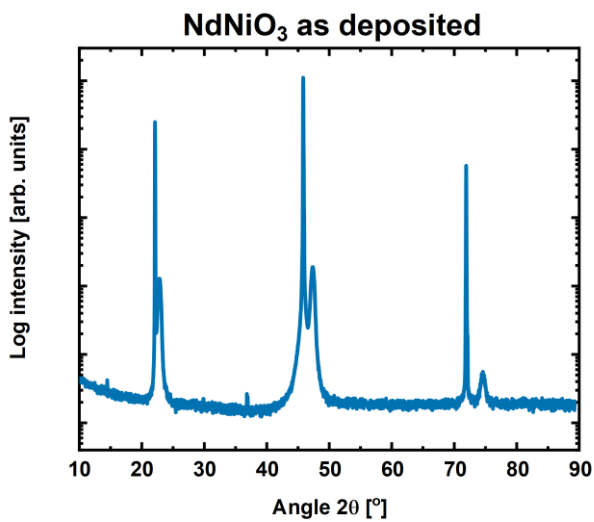
Source: Catalano S, Gibert M, Fowlie J, Íñiguez J, Triscone J-M, Kreisel J. Rare-earth nickelates RNiO_3 : thin films and heterostructures. Rep Prog Phys. 2018 Feb;81(4):046501.



Chemical composition and growth variation.

Left axis: variation in the Nd content in the film (percent of total cation content, measured with X-ray fluorescence) for different pulsing regimes given as percent Nd pulsed of total cation pulses. Shows that the composition can be precisely tuned.

Right axis: calculated film growth per cycle based on spectroscopic ellipsometry data, also for different pulsing regimes.



X-ray diffractogram of stoichiometric NdNiO₃ film.

X-ray diffractogram showing the substrate's (100), (200) and (300) Bragg reflections as the most intense peaks at around 22°, 46° and 71°, respectively. The corresponding thin film peaks are visible to the right of these. The distinct features from the film indicate oriented growth even as deposited, *i.e.*, without post-annealing/heat treatment. Epitaxy has been confirmed with reciprocal space mapping.