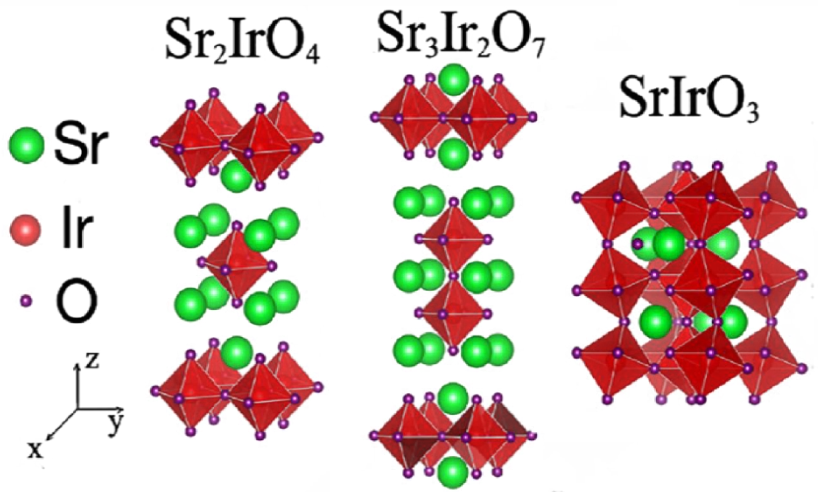
Understanding the Growth of Ruddlesden-Popper Oxides



The image shows the schematic structure of Sr_2IrO_4, $Sr_3Ir_2O_7$, and $SrIrO_3$. These materials, especially $Sr_3Ir_2O_7$, are a unique playground to study exotic physics such as spin-flop transitions.

J. Yang, L. Hao, P. Nanney, K. Noordhoek, D. Meyers, L. Horak, J. Sanchez, J.-H. Chu, C. Nelson, M. P. M. Dean, J. Liu, *Appl. Phys. Lett*. **114**, 182401 (2019).

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Scientific Achievement

Scientists studied the synthesis window of $Sr_{n+1}Ir_nO_{3n+1}$, Ruddlesden-Popper (RP) type oxides, and provided a more accessible avenue to stabilize metastable materials.

Significance and Impact

RP oxides provide a unique way to study exotic physics such as emergent phenomena; these findings offer insights for studying and engineering materials with specific electronic and magnetic properties.

Research Details

- Grew high quality films of Sr_2IrO_4, $Sr_3Ir_2O_7$, and $SrIrO_3$ by varying the oxygen pressure.
- Demonstrated growth window expansion by introducing argon into the growth chamber.
- Structural analysis of the RP oxides, by combining magnetic x-ray scattering at the NSLS-II ISR beamline with physical property measurements, provided the ability to draw a growth phase diagram.