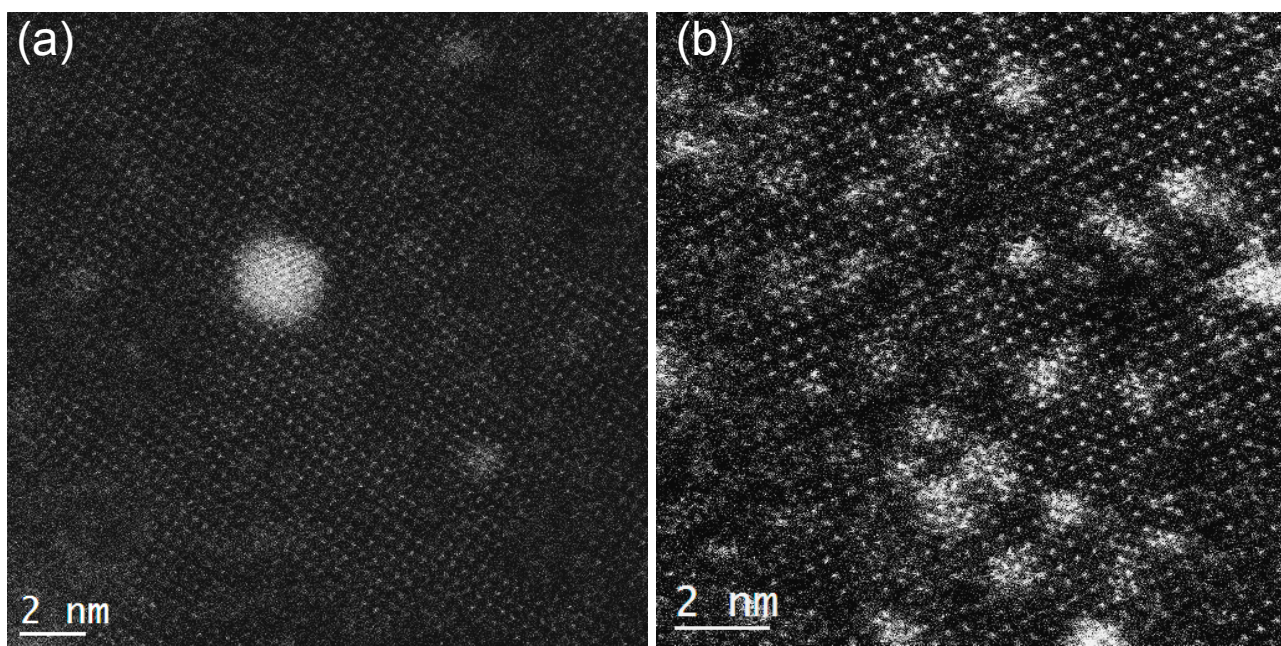


Mapping the Location of Electrons and Holes in Layered $\text{Ca}_2\text{Nb}_3\text{O}_{10}$ Photocatalyst

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Scientific challenge/problem: Layered $\text{Ca}_2\text{Nb}_3\text{O}_{10}$ is a strong candidate material for photocatalysis. To improve its photo-activity, it is crucial to understand the mechanism of water-splitting on the catalyst surface. The goal of this work is to identify the atomic location of the e⁻s and holes generated on the $\text{Ca}_2\text{Nb}_3\text{O}_{10}$ surfaces.



(a) Ag-labeled $\text{Ca}_2\text{Nb}_3\text{O}_{10}$ sheet.

(b) IrO_2 -labeled $\text{Ca}_2\text{Nb}_3\text{O}_{10}$ sheet.

Accomplishment: In both Ag and Pt labeled $\text{Ca}_2\text{Nb}_3\text{O}_{10}$ samples, the labeling particles are relatively large - no specific correlation between the Ag or Pt labeling atoms with the matrix atom columns is observed. On the other hand, the IrO_2 labeled sample demonstrates that with smaller labeling (or more diluted) particles, a correlation between labeling atoms and the matrix can be determined. Here, Ir atoms more likely reside on the Ca positions rather than Nb sites.