Supplemental Materials for

In situ atomic scale visualization of surface kinetics driven dynamics of oxide growth on Ni-Cr surface

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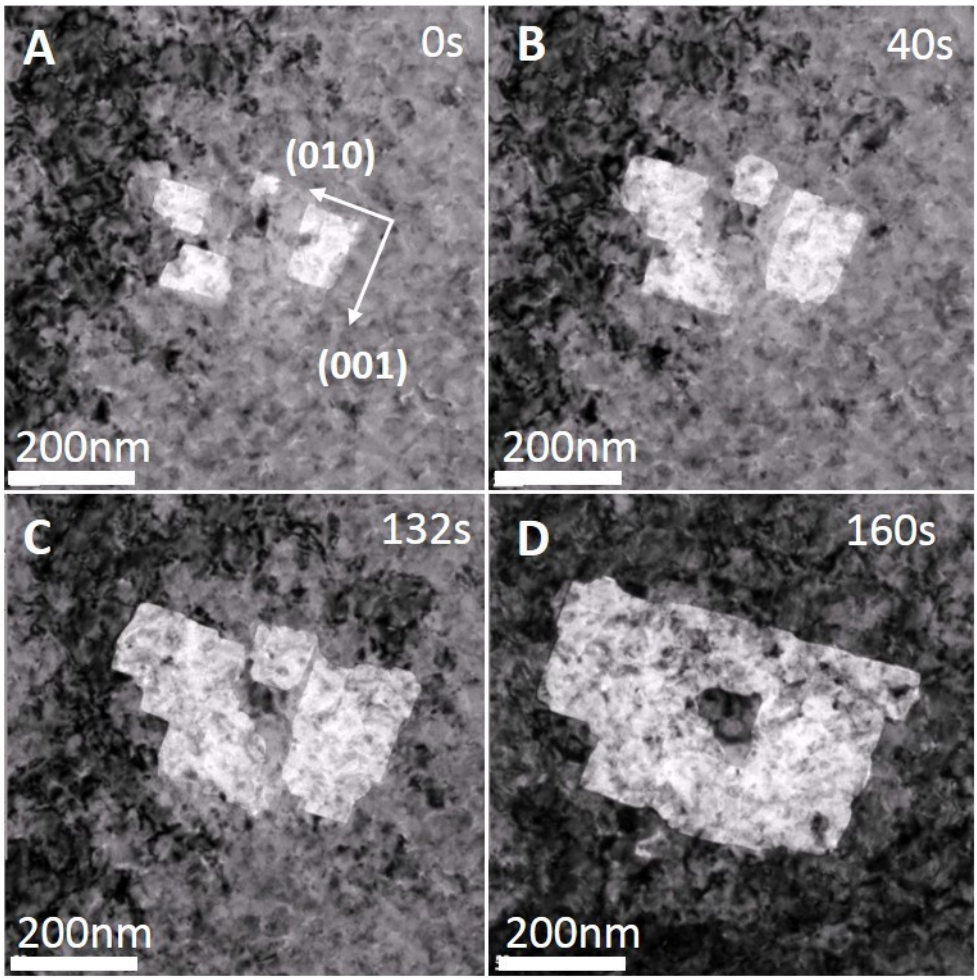

FIG. S1. Time-resolved bright-field TEM images of the Ni-10at%Cr(100) thin film oxidized at 600°C and $pO_2=1\times10^{-4}$mbar. The white contrast in the images presents the thinned area consumed by oxidation. The increasing area of rectangular brighter contrast shows the thinning process of the alloy film by depletion of Ni atoms. These depleted zones always show<001> edges, which indicates layer-by-layer "peeling" of the Ni atoms from the alloy surface.

VIDEO S1

In situ TEM video of nucleation and growth of NiO on two <110> edges of Ni-10at%Cr (100) during the oxidation at 450^{o}C and pO_2=3E-6mbar. The frame speed is 8X times of the real time.

VIDEO S2

In situ HRTEM video of adatom growth on (100) edge of Ni-10at%Cr thin film during the oxidation at 450^{o}C and pO_2=3E-6mbar. The frame speed is 2X times of the real time.

VIDEO S3

In situ HRTEM video of a transition from (100) to (110) surface of the NiO island during the oxidation at 450^{o}C and pO_2=3E-6mbar. The frame speed is 8X times of the real time.