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Segregation on Li-Al(110) alloy surface and initial oxidation

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The surface segregation of Li in Al(110)-12.7 at.%Li alloy and simultaneous reconstructions, and the initial oxidation are investigated using Auger electron spectroscopy, low energy electron diffraction, and ultraviolet photoelectron spectroscopy. The measured diffusion coefficient and barrier energy of Li segregation to the alloy surface was close to that of bulk one. The saturation coverage of Li was near 1 monolayer, that is, the ratio of atomic number of Li to Al is 1:1 after heat treatment. Based on the measurement of the surface Li coverages for the $c(2 \times 2)$ and (2×1) surface reconstructions, we suggest possible model structures. The oxidation was enhanced proportionally to the surface Li-segregation by electron donation mechanism. The adsorption of oxygen makes the work function of every surfaces initially decrease during LiO_x and AlO_x formation. It may be due to the initial oxide formation occurring in subsurface region. However, in nonsegregated surfaces, initial oxidation prefers the LiO_x formation.