

Investigation of Surface Phases of Pb and Bi Coadsorption on Cu(100) Using Low Energy Electron Diffraction

Kabiruzzaman, Md

Department of Molecular and Material Sciences, Kyushu University

Ahmed, Rezwan

Department of Molecular and Material Sciences, Kyushu University

Nakagawa, Takeshi

Department of Molecular and Material Sciences, Kyushu University

Mizuno, Seigi

Department of Molecular and Material Sciences, Kyushu University

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Investigation of Surface Phases of Pb and Bi Coadsorption on Cu(100) Using Low Energy Electron Diffraction

Md Kabiruzzaman*, Rezwan Ahmed, Takeshi Nakagawa, Seigi Mizuno
Department of Molecular and Material Sciences, Kyushu University, Kasuga, Kasugakoen 6-1, Fukuoka 816-8580, Japan

*Corresponding author email: kabir.apece@gmail.com

Abstract: *The surface phases formed by coadsorption of Pb and Bi on single crystal Cu(100) surface have been investigated using low energy electron diffraction (LEED). The complete phase chart is developed after the coadsorption of Pb and Bi with various coverages. Some notable phases that obtained are (1×1) , $c(2\times 2)$, $c(4\times 4)$, $c(9\sqrt{2}\times\sqrt{2})$. For individual adsorption of both Pb and Bi we reconfirmed the $c(2\times 2)$ structure with more accuracy by a tensor LEED analysis that they both occupy the four fold hollow sites. From the comparison of the structural parameters of coadsorption and individual adsorption we can assume that the $c(2\times 2)$ phase of coadsorption is the mixer of separate domains of $c(2\times 2)$ phases of Pb and Bi. In case of $c(4\times 4)$ of coadsorption, upon analyzing the $I(E)$ characteristics and tensor LEED calculation, it may be able to explain that Bi atoms substituted the Pb atoms or vice versa. This study opens a new window of further research of surface phase determination of coadsorption of Pb and Bi on Cu(100).*

Keywords: Lead; Bismuth; Coadsorption; Low energy electron diffraction; Surface phase.