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| **Abstract:** |  |
| Coadsorption of two heavy metals, Pb and Bi, on Cu(001) at room temperature has been studied using low energy electron diffraction (LEED). c(4 × 4), c(2 × 2), and c(9×9) phases are obtained at different coverages; here, we have determined the best-fit structure of c(4 × 4) phase. This structure can be described as a 1D substitutional chain arrangement of Pb and Bi atoms between the Cu rows along the [110] direction. The unit cell in the two-dimensional (2D) surface consists of one Bi atom, two Pb atoms, and four Cu atoms with one vacancy at the center. The optimal structure parameters demonstrate that Bi atoms are located at fourfold-hollow sites and that Pb atoms are laterally displaced by 0.78 Å from the fourfold-hollow site toward the vacancy. The reasons for the formation of the c(4 × 4) structure upon deposition of Pb and Bi on Cu(001) are discussed in comparison with a similar structure formed by the individual adsorption of Pb on the same substrate. | |