STM study of $C_{70}$ and $C_{60}/C_{70}$ mixture on Ag(100) WOEI WU PAI, L. Y. MANDY SIN, C. H. LIN, Center for Condensed Matter Sciences, National Taiwan University, Taipei, Taiwan, R.O.C. — The adsorption structure of $C_{60}$ on Ag(100) is a very interesting one because it is a uniaxial incommensurate aperiodic (111) phase with extensive adsorbate-induced reconstruction [1]. Peculiar molecular ordering arises therein due to delicate balance of competitive interactions. In contrast, few adsorption studies were conducted for the next abundant fullerene, $C_{70}$, which has an ellipsoidal shape. We have recently studied $C_{70}$ and $C_{60}/C_{70}$ mixtures of controlled ratios on Ag(100). We compare structures and molecular ordering of these two systems to that of $C_{60}/$Ag(100), and seek possible structural phase transitions therein. Our results show that $C_{70}$/Ag forms a commensurate phase i.e., c(6×4). The mixture adlayers evolve from c(6x4) to (111) with increasing $C_{60}$ ratios, as evidenced by low energy electron diffraction. In many cases, unidirectionally aligned bright lines were observed, e.g., at a $C_{60}$:$C_{70}$ ratio of 2:1. Such ordering cannot be explained by the model developed for $C_{60}$/Ag, and thus its origin remains controversial. Sequential deposition of $C_{60}$ and $C_{70}$ shows that $C_{60}$ intermix readily into the $C_{70}$ layer but not vice versa. This behavior suggests that kinetics of fullerene diffusion and intermixing may be crucial to determine the mixture structure. [1] W. W. Pai and C. L. Hsu, Phys. Rev. B 68, 121403 (2003); *ibid.* 68, 245414 (2003)

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