Slippage of Nonsuperfluid ^{3}He-^{4}He Mixture Film on Gold

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There have been observed slippage behaviors of nonsuperfluid helium films from various oscillating substrates, graphite, hectorite, and porous gold, by various oscillator techniques. The slippage behaviors are basically reported for pure ^{4}He or ^{3}He films. We report here a result of our QCM experiment (100 MHz) for a ^{3}He-^{4}He mixture film ($n_4 = 37.38$, $n_3 = 7.93$ μmol/m^2) on flat gold substrate. This study is done by taking temperature scan of both warming and cooling at various constant oscillation amplitudes v from 19 to 59 μm/s. At minimum $v = 19$ μm/s, the frequency shift about 5 Hz due to the superfluid transition is observed below the onset temperature $T_o = 0.195$ K. Surprisingly, at $v = 35$ μm/s, the observation is dramatically changed and an extra large frequency shift with a hysteresis loop between warming and cooling is found. As increasing v further, the extra shift evolves into much larger shift than the expected value of the superfluid transition. These observations suggest that a part of nonsuperfluid component in the ^{3}He-^{4}He mixture film slips by a pinning-depinning mechanism above $v = 35$ μm/s. At maximum $v = 59$ μm/s, the decoupling ratio of slippage reaches to 10% of the whole mixture film. Further details will be presented.