Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Omni-directional light emission via surface plasmons from a metal-polymer-metal structure JOHN S.Q. LIU, MARK L. BRONGERSMA, Stanford University — Light extraction from LEDs is an important efficiency problem. Planar metallic microcavities have been used in the past to allow facile electrical excitation and obtain resonantly enhanced emission. In general this emission is only enhanced in a narrow angle range, while for some applications a wide emission angle is desirable. We will demonstrate that by using a properly designed, planar, metallic microcavity it is possible to enhance the free space emission via low momentum surface plasmons that lie above the light line. Additionally, for an optimized cavity thickness this enhanced emission can be observed at a well-defined frequency for all angles due to a nearly flat surface plasmon dispersion relation, hence the term omni-directional emission. This effect is predicted through simulations of dipole emission and verified in photoluminescence experiments using gold as the metal and a light-emitting polymer (DOW BP79) as the active medium.

John S.Q. Liu
Stanford University

Date submitted: 01 Dec 2004 Electronic form version 1.4