

Development of Mechanical Plasmon Device Utilizing a Single-Crystalline Metal Film on NaCl (001) Substrate

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Summary

A new experimental technique is developed for producing a low-loss single-crystalline metal film on any substrate for use in plasmonics and metamaterials. This technique is based on the epitaxial growth of gold on a (001)-oriented single-crystalline NaCl substrate obtained using EBSD, which is subsequently dissolved in ultrapure water to allow the film to be transferred onto transparent amorphous substrates. Further, spectroscopic ellipsometry measurements indicated that the imaginary part of the dielectric constant of the single-crystalline film was smaller than that of a conventional polycrystalline film. Moreover, a new process flow for structural health monitoring is provided device of a combined MEMS and single-crystalline metal film by authors.