



Fig. 7. (a) Calculated intrinsic sensitivities and (b) decay lengths of long-range guided modes in a layer of Au (blue-dashed-dotted curve), c-GST (green-dashed curve) and a-GST (red-solid curve) with a thickness of 20 nm as a function of the wavelength. (c) Intrinsic sensitivity and (d) decay length ratios between a layer of a-GST or c-GST and Au (solid and dashed curves respectively) as a function of the wavelength. The thin layer is surrounded by a medium with a refractive index of 1.33.

to the thin layer.

5. Conclusions

We have demonstrated that strong optical absorption in materials is not a limitation for the sensitivity of surface wave sensors. In particular, we have shown that long-range guided modes supported by nanometric films of strongly absorbing chalcogenide glasses can be used as sensitive probes of changes in the refractive index of the surrounding medium. Our results open a new range of possibilities for surface wave sensing using different substrates and operating at shorter wavelengths, thereby reducing the decay length of the field from the surface. A larger field confinement can be exploited to increase the sensitivity to changes in functionalized surfaces.

Acknowledgments

We acknowledge M. Maas, H. de Barse, A.P.M. de Win and H. Herps for technical assistance during sample fabrication and characterization and M. Verschuuren, V. Giannini and M. Forcales for discussions. This work was supported by the Netherlands Foundation Fundamenteel Onderzoek der Materie (FOM) and the Nederlandse Organisatie voor Wetenschappelijk Onderzoek (NWO) and it is part of an industrial partnership program between Philips and FOM.