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PTU-233

Role of target preconditioning on the thermo-optical response of Bi nanostructures produced by pulsed laser deposition

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The transmission of Bi nanostructures (NSs) embedded in amorphous Al_2O_3 thin films under heating-cooling cycles shows hysteresis loops characterized by a sharp optical contrast at the melting-solidification temperatures. The optical contrast and the transition temperature are a function of the characteristic size of the NS [1-2]. This property has a high potential for the design of thermo-optical switches and sensors. In this work it is shown how the optical and thermo-optical properties of the Bi NSs can be modified by pre-conditioning of the Bi target used for deposition. The nanostructured films have been prepared by alternate pulsed laser deposition from Al_2O_3 and Bi targets at room temperature under vacuum. They are formed by layers of Bi NSs embedded in amorphous Al_2O_3. The characteristic size of the NSs is varied by changing the Bi content per layer Two series of samples have been deposited. For the first series the ablation of the Bi target for the formation of Bi NS was performed after pre-ablating the target for 10 s at 5 Hz. For the second series no pre-ablation of the target was performed. Optical absorption spectra show that the absorption in the visible range (300-1000 nm) corresponding to the Bi NSs of the first series is higher than that of the second series NSs. The thermo-optical properties also show a remarkable change. The optical contrast shown by the heating-cooling hysteresis cycles is twice as high for the Bi NSs of the first series compared to that for those the second one. Moreover the melting temperature for the Bi NSs of the first series is $\sim$20 ^{o}C higher than that of the second series. The results show the importance of target preconditioning to enhance the optical response of the Bi NS, and a route to achieve films with a lower switching temperature.

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PTU-235

RF Plasma-Assisted Femtosecond Pulsed Laser Deposition of Metal Nitride Thin Films

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Metal nitrides have several peculiarities which allow their use in a great variety of de-

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[1] Davis et al.

[2] Fletcher et al

[3] Little et al. J.

[4] Ferrer et al. J

PTU-238

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*Florence Garrelie
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