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**Coherent Perfect Absorption of a Transparent Polymer Film on a transparent substrate utilizing Total Internal Reflection by Grazing Incidence****Takayoshi Kobayashi***The University of Tokyo, Japan*

In the present study, we have demonstrated that CPA is realized for a nearly transparent sample in the visible range, with a single dielectric layer sandwiched by semi-infinite dielectric layers. This configuration is one of the simplest configuration for CPA. A transparent PVP film sandwiched between MgF<sub>2</sub> and the air makes the FP resonator with TIR at the interface with air. Collimated white light incident from the side of the substrate nearly-normal incidence with transmittance >92.6% dip in the transmission spectrum from the opposite side. The required conditions for CPA in this configuration of a single-layer thin film are: (I) transparent thin film must have tiny absorption, (II)  $n_1 > n_0 > n_2$ , where  $n_0, n_1$ , and  $n_2$  are the refractive indices of the substrate, thin film, and surrounding medium, and (III) grazing-incidence configuration. (II) is constructed in such a way that light can enter the thin film (TF) when incident from the substrate side, and large reflectivity at the substrate-TF interface as well as TIR at the TF-surrounding medium interface are realized. The grazing-incidence requirement of (III) is because of the approximate CPA condition. For transparent materials, absorbance  $q$  is  $\sim$ zero, requiring reflection at interface between  $n_0$  and  $n_1$   $|r_{01}| \sim 1$ . Although the reflectance increases with difference in  $n$ , grazing incidence allows  $|r_{01}| \sim 1$  to be possible, even when  $\Delta n$  is small. Therefore, there are many other candidates of substrate-thin film combinations of transparent dielectric materials that can make CPA feasible for future applications and study not only with the combination of solid-solid, but also with that of solid-liquid or liquid-liquid.

**Biography**

Takayoshi Kobayashi has completed his PhD at The University of Tokyo (UT), Reseacher at Riken, an emeritus professor of the UT, Guest professors of Tokyo University of Science, University of Electro-Communications, Director of Advanced Ultrafast Laser Center of National Chiao-Tung University, He has published >650 papers in reputed journals and has been serving as a Chief Editor of Applied Sciences.