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発表内容：

Thallium bromide (TlBr) is a candidate for detectors of high energy photons such as X-ray and  $\gamma$ -ray because of its high photon stopping power [1, 2]. For making better radiation detection devices, it is important to clarify the relationship between optical properties and electronic band structure. In this work, we report on the dielectric function spectra and the related inter-band optical transitions in TlBr.

The electronic dielectric function spectra of TlBr have been studied by spectroscopic ellipsometry (SE). The measurements are carried out on the surfaces of bulky TlBr at an incident angle of 65 degrees in the energy range of 2.0-5.5 eV. The clean surfaces for the SE measurements are obtained after cutting the bulky crystal with a wire saw and mechanical polishing with 0.1 $\mu$ m alumina suspension. The critical points (CPs) for inter-band optical transitions have been determined from the second derivative spectra of the retrieved pseudo-dielectric function spectra.

Figure 1 shows the real and imaginary parts of the pseudo dielectric function spectra of the TlBr crystal. We can clearly see some structures related to the inter-band optical transitions. The extracted main optical transition energies are indicated by vertical arrows in the figure. The  $E_0$  transition is assigned to the ground state exciton associated with the transition at the direct minimum gap [3], and assignment of the other transitions in Fig. 1 is made on the base of the calculated electronic band structure [3,4].

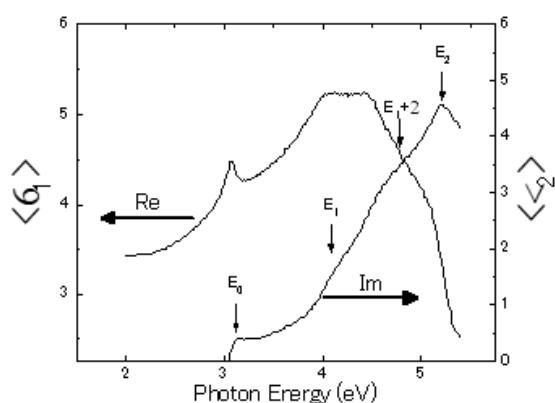


Fig. 1 Real and imaginary parts of the pseudo-dielectric function spectra of TlBr.

## References

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会議参加の感想：

他グループの研究者との議論や研究者のテーマと関連した話題について情報収集を行った。エリプソメトリの学会であったので、応物などとは異なりより踏み込んだ議論になり自分の理解を深めることができ知見を広げることができた。また、TlBrに関する報告を行い、各講演者との議論により今後のエリプソメトリを扱う上で、研究に関するヒントを得ることができ、次なる目標や問題解決への手掛かりとなった。