

Abstract Submitted  
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**A transparent superconductor: LiTi<sub>2</sub>O<sub>4</sub> epitaxial films** TARO HITOSUGI, Tohoku Univ., TAKEO OHSAWA, National Institute for Materials Science, TSUTOMU NOJIMA, RYOTA SHIMIZU, Tohoku Univ., NAOOMI YAMADA, Chubu Univ., SUSUMU SHIRAKI, Tohoku Univ. — A framework is presented for the transparent conducting mechanism of transparent conductor LiTi<sub>2</sub>O<sub>4</sub>. Within the Bardeen-Cooper-Schrieffer (BCS) theory, achieving high superconducting transition temperature ( $T_c$ ) requires large carrier density at Fermi energy. This requirement prohibits the emergence of transparent superconductivity at high temperature, since the large carrier density leads to the optical absorption in visible. However, we here demonstrate high optical transmittance in superconducting LiTi<sub>2</sub>O<sub>4</sub>(111) epitaxial with  $T_c$  exceeding 13 K. Photoemission studies, electron transport measurements and optical analysis reveal the key role of electron effective mass, shifting a plasma frequency to infrared region.

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