

Wavelength conversion in the Ta₂O₅ based submicron channel waveguide**Chung-Lun Wu, Yi-Jen Chiu, Cong-Long Chen, Yuan-Yao Lin,****Ann-Kuo Chu and Chao-Kuei Lee****Department of Photonics, National Sun Yat-sen University, Kaohsiung 804, Taiwan R. O. C.***E-mail: chuckcklee@yahoo.com**

Four-wave-mixing in optical communication region has been successfully demonstrated by using the Ta₂O₅ based submicron channel waveguide. The geometrical dimension of Ta₂O₅ core is 700×400 nm². The ultra-low propagation loss of 1.5 dB/cm in the Ta₂O₅ based channel waveguide enables the high power propagating in the core layer. Based on the continuous wave pump-probe measurement at pump/probe wavelengths of 1555.373/1556.08 nm, the converted signals of 1554.667/1556.787 nm via FWM processing in the Ta₂O₅ based channel waveguide are observed. The conversion efficiency of -49 dB is determined, and the calculated nonlinear refractive index is $1.5 \pm 0.6 \times 10^{-14}$ cm²/W at ~1550 nm. Our primarily results indicate that the nonlinear optical property of Ta₂O₅ is comparable to Si₃N₄, and shows great potentials in the nonlinear waveguide applications.