Temperature and polarization dependent photoluminescence studies of WO$_3$ and WO$_3$-x single crystals$^1$ EMILY MAKOUTZ, Michigan Technological University, PRASENJIT DEY, DENIS KARAISKAJ, University of South Florida — WO$_3$ is an important material not only due to its interesting electronic properties but also due to applications in electrochromic devices and energy storage. The mechanism behind the electrochromic effect has been debated for several decades [1]. We have studied two WO$_3$ single crystals, a transparent and doped WO$_3$-x. A photoluminescence center around 865 nm is observed after sub-band gap excitation at 405 nm with relatively higher intensity in the crystal containing oxygen vacancies. The center appears as a broad transition of 35 nm FWHM and does not follow the band gap energy with temperature. However polarization dependent studies reveal at least two polarization dependent components of the center. To further investigate the polarization dependence for the two WO$_3$ crystals, we will use samples for which the orientation of the high axis of symmetry is known.

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