THE OPACITY OF TiO

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We have computed a high temperature (4,000K) opacity database for TiO. The electronic states considered are X $^3\Delta$, E $^3\Pi$, D $^3\Sigma^-$, A $^3\Phi$, B $^3\Pi$, C $^3\Delta$, a $^1\Delta$, d $^1\Sigma^+$, b $^1\Pi$, c $^1\Phi$, f $^1\Delta$, and two additional singlets, which we call g $^1\Gamma$, and h $^1\Sigma^+$. These calculations include spin-orbit and rotation-orbit coupling of the electronic states, so we explicitly obtain predictions for both allowed and forbidden transitions. When possible, the potential energy curves and spin-orbit and rotation-orbit functions were parameterized by fitting to experimental data, and when not possible, the results from *ab initio* electronic structure theory are used. It was possible to fit experimental data very well for most bands, with the exceptions being the B and C states. It is probable that experimental data for $v \geq 2$ is required to improve the description of the B state. The transition moments and dipole moments used were obtained from *ab initio* electronic structure calculations.