

**Investigating Semiconductor Trap States
Energetics via Photothermal Beam Deflection
and Photoacoustic Spectroscopy**

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Trap state energetics in semiconductors, such as TiO₂ and SnO₂, are known to contribute in electron transfer kinetics as long-lived components on the transient absorbance time scale. While the rates of occupation and evacuation of these trap states are easily measured via conventional spectroscopy, the thermodynamic properties of these states are elusive. In this study, we consider the application of Time-Resolved Photothermal Beam Deflection (TRPBD) and Time-Resolved Photoacoustic Spectroscopy (TRPAS) to these systems to elucidate trap state energetics.