Nowadays, the need for minimizing the level of environmental pollution has increased attention to degradation of organic hazardous materials present in a wide range of industrial activities. The advanced oxidation process through the photoactivated reaction by photocatalysts, using TiO2, has been efficiently used to remove recalcitrant pollutants present in industrial wastewaters. However, the weak photon absorption in the visible spectrum of solar light limits its applications. Several successful attempts have been made to extend the absorption of TiO2 from UV to visible region by modifying its properties throughout surface alteration or impurity doping. Highly sensitive and precise detection methods are required to evaluate the visible light activity of the photocatalysts and related properties avoiding the side influences of the other processes. Such requirements are satisfied by techniques based on photothermal effects such as photothermal deflection spectroscopy (BDS), or thermal lens spectroscopy (TLS). The general principle of operation of the photothermal methods relies onthe generation of heat by periodical excitation of the sample. The results of the pure and Cu/Zr modified TiO_2characterizing using photothermal techniques to determine their energy band gap and photocatalytic activity is presented.