

# Pengaruh ukuran partikel terhadap performa fotokatalisis titanium oksida = Effect of particle size on photocatalytic performance of titanium oxide.

Aldi Alfarizi, author

Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=20513393&lokasi=lokal>

---

## Abstrak

Titanium oksida ( $\text{TiO}_2$ ) merupakan senyawa semikonduktor yang paling banyak diteliti dalam proses pengolahan limbah melalui teknik fotokatalisis. Penelitian ini bertujuan untuk mencari keterkaitan ukuran partikel  $\text{TiO}_2$  terhadap performa fotokatalisis. Investigasi juga dilakukan untuk mengetahui hubungan antara parameter fisis bahan seperti ukuran kristalit dan luas permukaan terhadap parameter optis bahan seperti energi celah pita dan analisis gugus fungsional pada panjang gelombang infra-merah. Dalam studi ini digunakan bahan  $\text{TiO}_2$  dengan ukuran nano, mikro, serta hasil sintesis menggunakan perlakuan ballmill. Uji performa fotokatalisis dilakukan dengan lampu sinar UV berdaya 56 watt dimana hasil optimum degradasi limbah untuk bahan  $\text{TiO}_2$  ukuran nano dengan ukuran kristalit fasa anatase dan rutile sebesar 18.61 nm dan 40.74 nm, ukuran partikel sebesar 25 nm, serta luas permukaan sebesar 124.192 m<sup>2</sup>/g. Pengujian spektroskopi UV-Vis terhadap bahan  $\text{TiO}_2$  nano memberikan informasi energi celah pita sebesar 3.44 eV, sedangkan hasil uji FTIR mengkonfirmasi data kemurnian bahan yang sangat tinggi.

.....Titanium oxide ( $\text{TiO}_2$ ) is the semiconductor compound that is most widely studied in the waste treatment process through photocatalytic techniques. This study aims to find the relationship between  $\text{TiO}_2$  particle size and photocatalytic performance. Investigations were also carried out to determine the relationship between physical parameters of the material such as crystallite size and surface area to optical parameters of the material such as bandgap energy and analysis of functional groups at infrared wavelengths. In this study,  $\text{TiO}_2$  was used with nano, micro sizes, and synthesized using a ballmill treatment. The photocatalytic performance test was carried out with 56 watts of UV light, where the optimum results of waste degradation for nano-size  $\text{TiO}_2$  with anatase and rutile phase crystallite sizes were 18.61 nm and 40.74 nm, particle size was 25 nm, and surface area was 124,192 m<sup>2</sup>/g. UV-Vis spectroscopy testing of  $\text{TiO}_2$  nano material provides information on the bandgap energy of 3.44 eV, while the FTIR test results confirm very high material purity data.