Fotodegradasi Methyl Orange Menggunakan Cu-ZnO/Graphene Oxide di Bawah Penyinaran Sinar Tampak = Photodegradation of Methyl Orange with Cu-ZnO/Graphene Oxide Under Visible Light Irradiation

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Abstrak

Industri tekstil menggunakan pewarna tekstil, seperti methyl orange, yang sulit terurai dan tidak ramah lingkungan sehingga dapat menyebabkan pencemaran air. Oleh karena itu, perlu dilakukan optimasi pengolahan air limbah hasil samping kegiatan industri. Pada penelitian ini, telah berhasil disintesis Cu-ZnO/GO sebagai katalis untuk fotodegradasi methyl orange dengan nanokomposit Cu-ZnO/GO. ZnO yang semula memiliki energi celah pita senilai 3,18 eV, saat didoping oleh Logam Cu dan GO memiliki energi celah pita yang lebih rendah yaitu senilai 2,49 eV ditinjau dengan UV-Visible Diffuse Reflectance Spectroscopy (DRS) dan persentase degradasinya terhadap methyl orange meningkat dari 62,18% saat menggunakan ZnO menjadi 93,48% saat menggunakan Cu-ZnO/GO ditinjau menggunakan UV-Vis Spectrophotometer. Katalis-katalis yang telah disintesis juga ditinjau menggunakan karakterisasi Fourier Transform Infrared Spectroscopy (FTIR), Scanning Electron Microscopy - Energy Dispersife X-Ray Spectroscopy (SEM-EDS), Raman Spectroscopy, X-ray Diffraction (XRD), dan Transmission Electron Microscopy (TEM).

.....The textile industry uses textile dyes, such as methyl orange, which are difficult to decompose and are not environmentally friendly, which can cause air pollution. Therefore, it is necessary to optimize the treatment of by-products of industrial activities. In this study, Cu-ZnO/GO was successfully synthesized as a catalyst for photodegradation of methyl orange with Cu-ZnO/GO nanocomposites. ZnO, which originally had a bandgap energy of 3.18 eV, when doped by Cu Metal and Graphene Oxide, has a lower bandgap energy of 2.49 eV measured using UV-Visible Diffuse Reflectance Spectroscopy (DRS) and the percentage degradation of methyl orange increased from 62.18% when using ZnO to 93.48% when using Cu-ZnO/GO measured using UV-Vis Spectrophotometer. The synthesized catalysts were also characterized using Fourier Transform Infrared Spectroscopy (FTIR), Scanning Electron Microscopy - Energy Dispersive X-Ray Spectroscopy (SEM-EDS), Raman Spectroscopy, X-ray Diffraction (XRD), and Transmission Electron Microscopy (TEM).