Electronic Supplementary Material (ESI) for RSC Advances.

Supporting information

for

Effect of silver doping on TiO_2, CdS, and ZnS nanoparticles for the photocatalytic degradation of metronidazole under visible light

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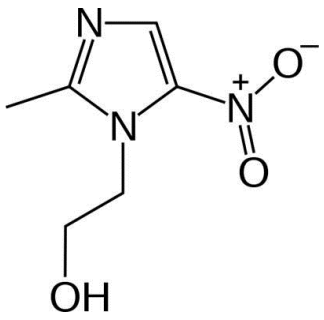

Figure 1. The chemical structure of metronidazole.

The FTIR spectroscopy study was carried out of pure metronidazole (MTZ) before degradation to study the structural change of antibiotic after degradation. The FTIR spectra (Figure 2) of pure MTZ before degradation showed several characteristic peaks. The peak at 3623.61 cm^{-1} is due to the O-H stretching of free hydroxyl group. The band due to the intra molecular hydrogen bonding of O-H stretching appears at 3221.7 cm^{-1}. The alkene mono substituted C-H stretching frequency appears at 3100.99 cm^{-1}, 2982 cm^{-1} and 2957.54 cm^{-1}. The saturated carbon of C-H stretching frequency appears at 2846.38 cm^{-1}. The peak at 1659.01 cm^{-1} and 1641.93 cm^{-1} are due to the -C=C- stretching of alkenes. The N-O asymmetric stretching frequency appears at 1536.1 cm^{-1} and 1476.29 cm^{-1}. The peak at 1427.77 cm^{-1} is due to the C-C stretching. The C-N stretching frequency appears at 1265.42 cm^{-1}. The peak at 1074.29 cm^{-1}, 1158.17 cm^{-1} and 1187.52 cm^{-1} are due to the C-O stretching. The O-H bending frequency appears at 949.16 cm^{-1}. The peak at 678.31 cm^{-1}, 716.49 cm^{-1}, 743.83 cm^{-1}, 825.67 cm^{-1} and 864.1 cm^{-1} are due to the C-H "oop" bond. So, the FTIR studies confirmed the structure of pure MTZ.

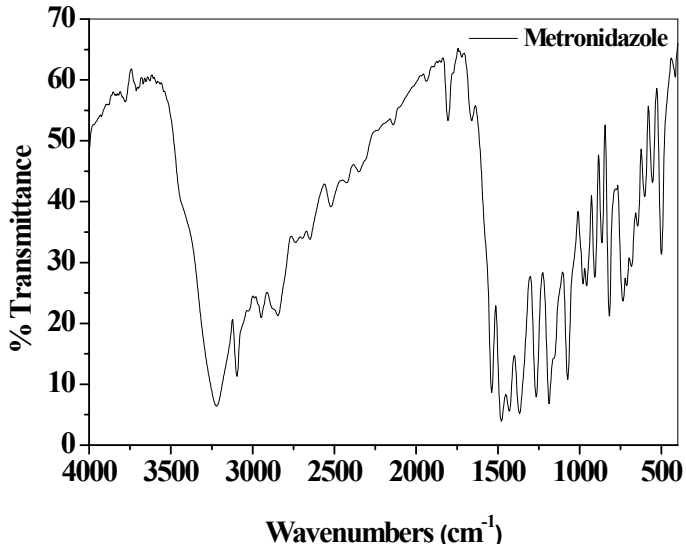

Figure 2. FTIR spectra of pure metronidazole solution before degradation.

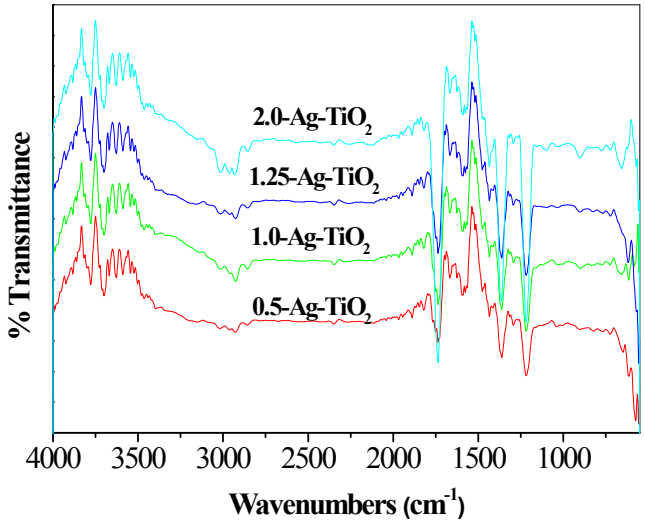

Figure 3. FTIR spectra of metronidazole solution after degradation using 0.5-Ag-TiO_2, 1.0-Ag-TiO_2, 1.25-Ag-TiO_2 and 2.0-Ag-TiO_2.

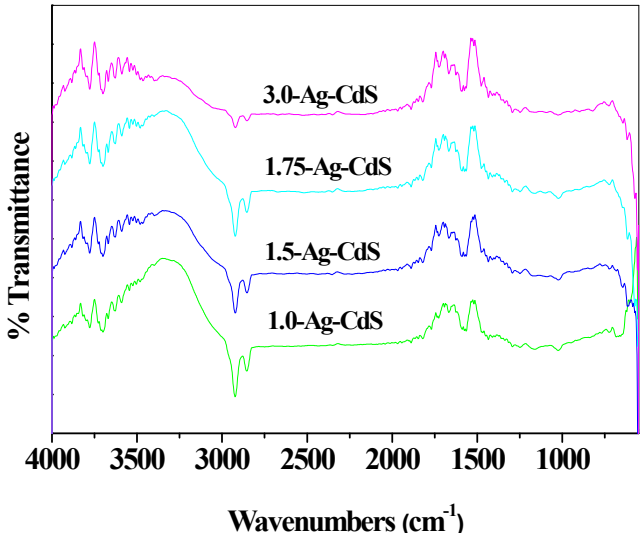

Figure 4. FTIR study of MTZ solution after degradation using 1.0-Ag-CdS, 1.5-Ag-CdS, 1.75-Ag-CdS and 3.0-Ag-CdS nanoparticles.

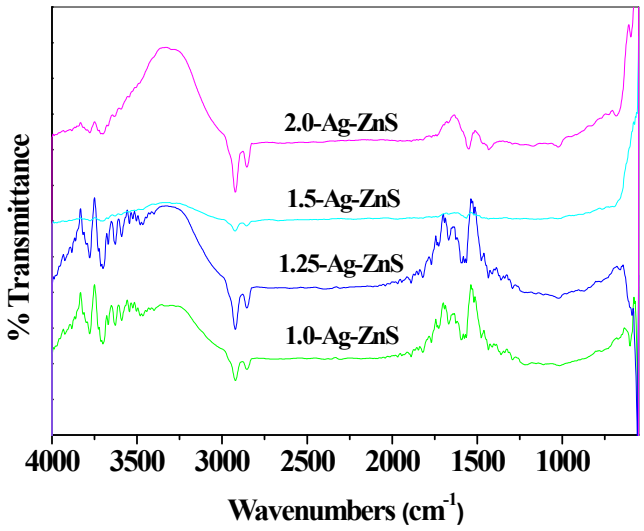

Figure 5. FTIR study of MTZ solution after degradation using 1.0-Ag-ZnS, 1.25-Ag-ZnS, 1.5-Ag-ZnS and 2.0-Ag-ZnS nanoparticles.