Abstract Submitted
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Graphene quantum dot synthesis using nanosecond laser pulses and its comparison to Methylene Blue[1] KHOMIDKHODZA KHOLIKOV[2], ZACHARY THOMAS[3], DOVLETGELDI SEYITLIYEV[4], SKYLAR SMITH, Western Kentucky University — A biocompatible photodynamic therapy agent that generates a high amount of singlet oxygen with high water dispersibility and excellent photostability is desirable. In this work, a graphene based biomaterial which is a promising alternative to a standard photosensitizers was produced. Methylene blue was used as a reference photosensitizer. Bacteria deactivation by methylene blue was shown to be inhibited inside human blood due to protein binding. Graphene quantum dots (GQD) were synthesized by irradiating benzene and nickel oxide mixture using nanosecond laser pulses. High resolution transmission electron microscopy (HR-TEM), scanning electron microscopy (SEM), atomic force microscopy (AFM), Fourier transform infrared (FTIR) spectroscopy, and nuclear magnetic resonance (NMR) were used for characterization of GQDs. Initial results show graphene quantum dots whose size less than 5 nm were successfully obtained. UV-VIS spectra shows absorption peak around 310 nm. The results of these studies can potentially be used to develop therapies for the eradication of pathogens in open wounds, burns, or skin cancers. New therapies for these conditions are particularly needed when antibiotic-resistant infections are present.

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