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## Application of Fe-graphene oxide nanocomposite to improve SERS intensity of polyaromatic hydrocarbons\*

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Raman spectroscopy is used to provide a structural finger-print by which molecules can be identified. SERS technique offers many orders of magnitude enhancement in initial weak Raman signal of some molecules. To detect Raman signal of pyrene, magnetic iron nanoparticles (Fe NPs) were employed along with graphene oxide (GO). Significant differences were discovered in performance of five different SERS substrates which were prepared using magnetized and non-magnetized Fe NPs-GO nanocomposites (FNRC) and Ag nanoparticles. UV-Vis, Raman and FE-SEM analysis presented complete formation of Ag-NPs, GO and FNRCs. The quantity of enhancement measured showed different enhancements from 1.09 up to 3.54 times for pyrene solution on magnetized Fe NP-GO nanocomposite. SERS enhancement showed a reverse relation with GO/Fe precursor rate. Raman shift suggested formation of new bonds. 2.017 RSD factor presented very fast performance only 10 seconds after irradiation of magnetized FNRCs.

**Key words:** Raman scattering, pyrene, maghemite, manetite.

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