

New MEES Applications

Uriah Hella Sharon, Valery Bulatov and Israel Schechter
Schulich Faculty of Chemistry, Technion – Israel Institute of Technology

The MEES System

Multiphoton Electron Extraction Spectroscopy is an analytical tool which uses OPO laser for resonant and non resonant ionization. The ionization spectra are unique to a molecule and can be used for identification and quantification.

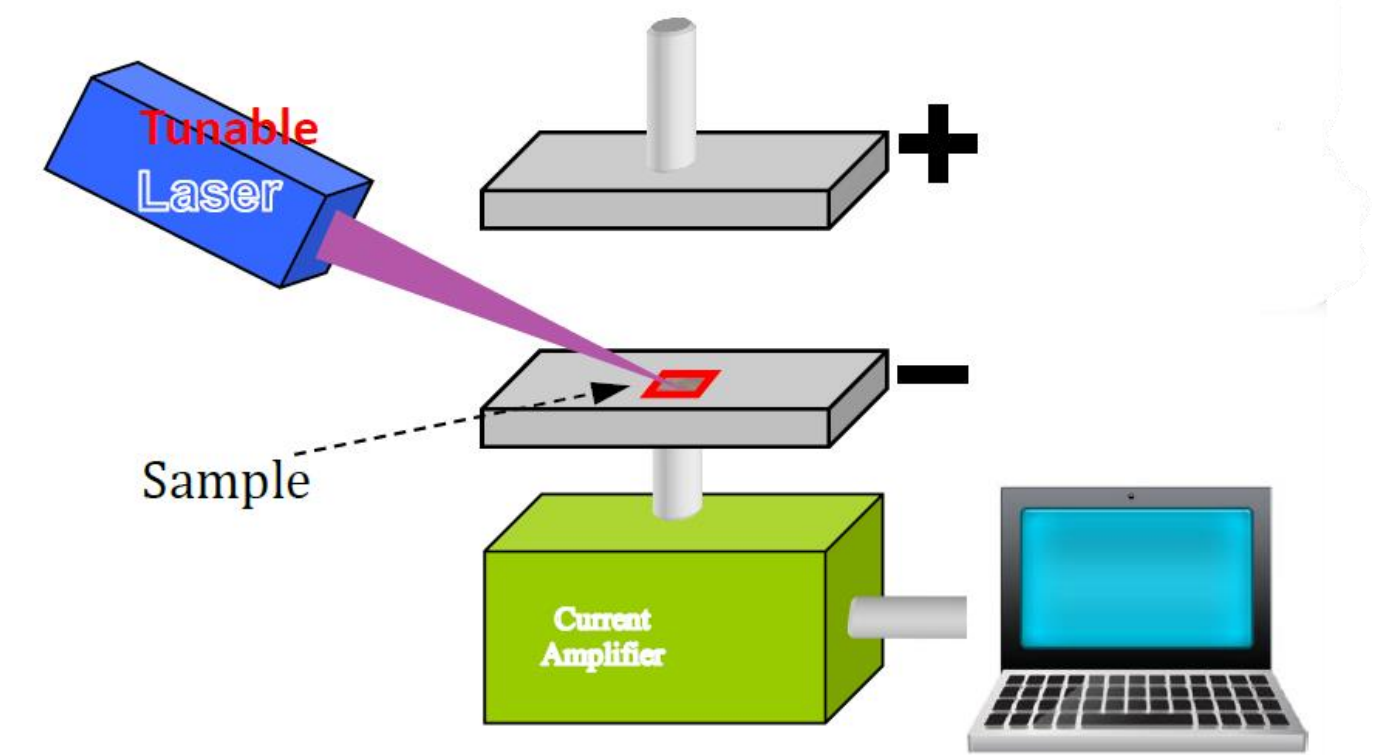


Fig. 1 : Schematic surface - MEES setup.

MEES of Chromophores

Identification and differentiation between chromophores is of importance in many applications, such as authentication of paintings and restoration purposes. MEES can be useful in archeology, art history, and also in forensics. We found that MEES can differentiate between various inks, colored pencils and papers.

MEES can also be operated in surface scanning mode, which allows for mapping of the chromophores and providing chemical surface morphology.

Colored Pencils MEES Spectra Average

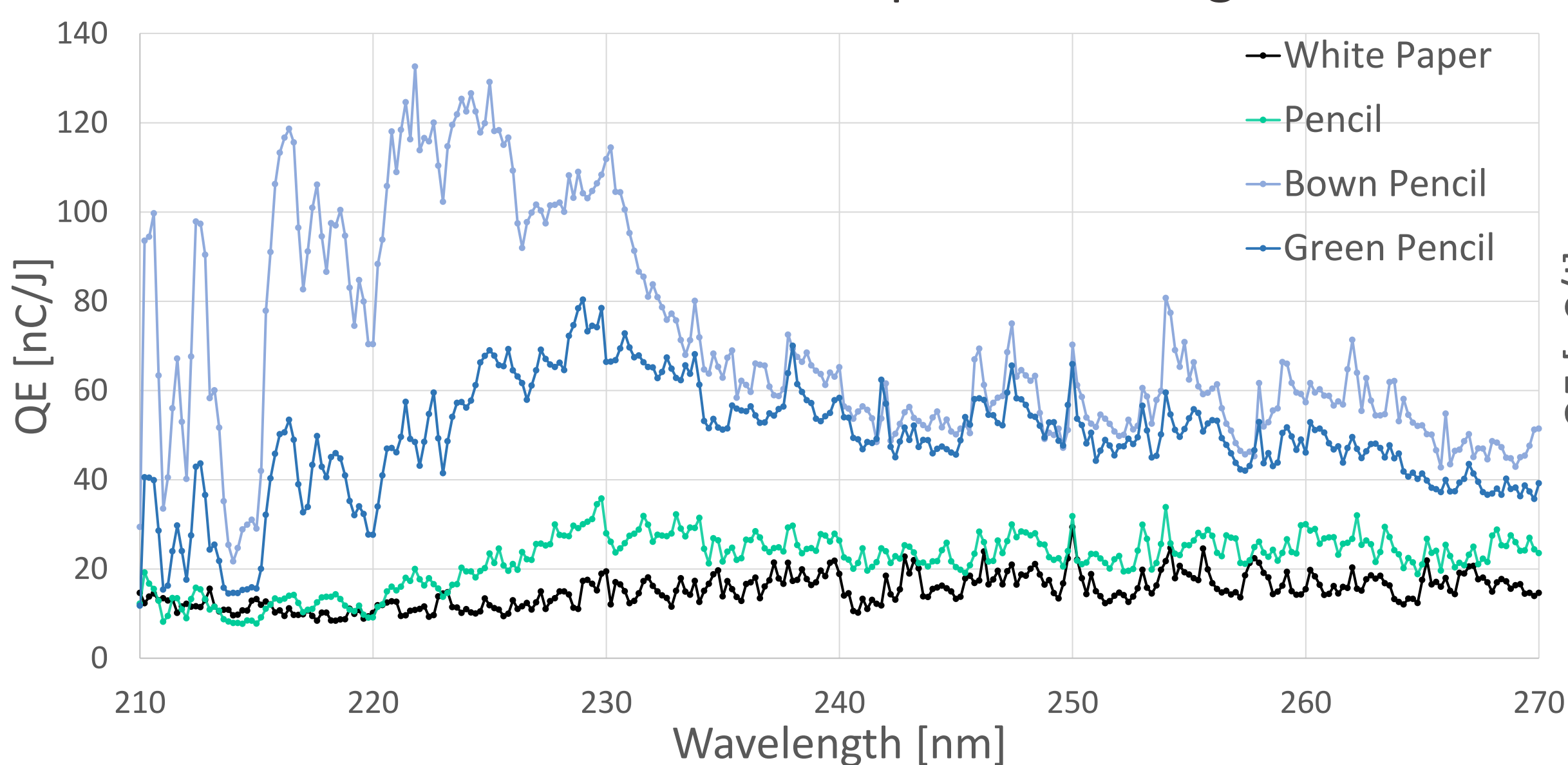


Fig. 2: MEES spectra of colored Pencils.

Various Pens' Inks MEES

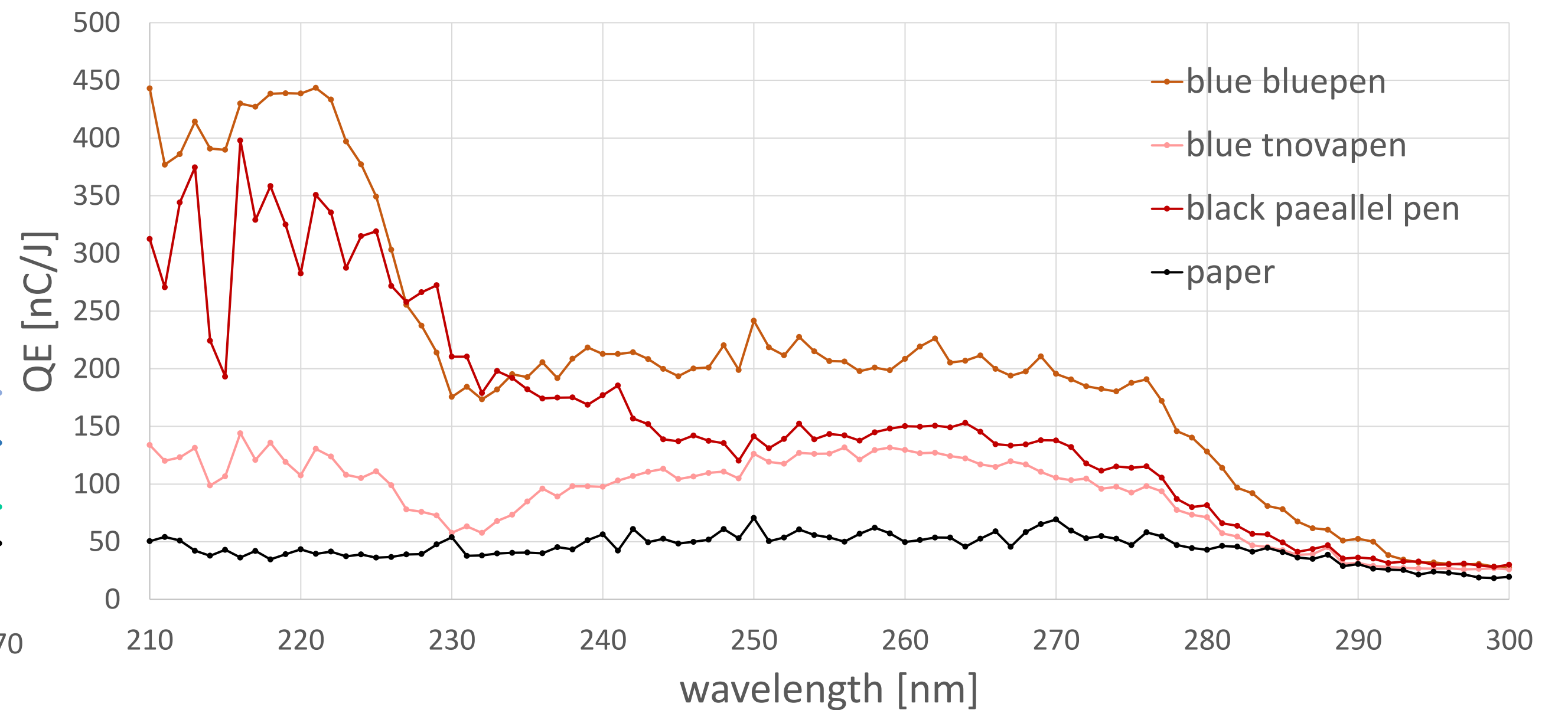


Fig. 3: MEES spectra of inks, in the range 210-300nm .

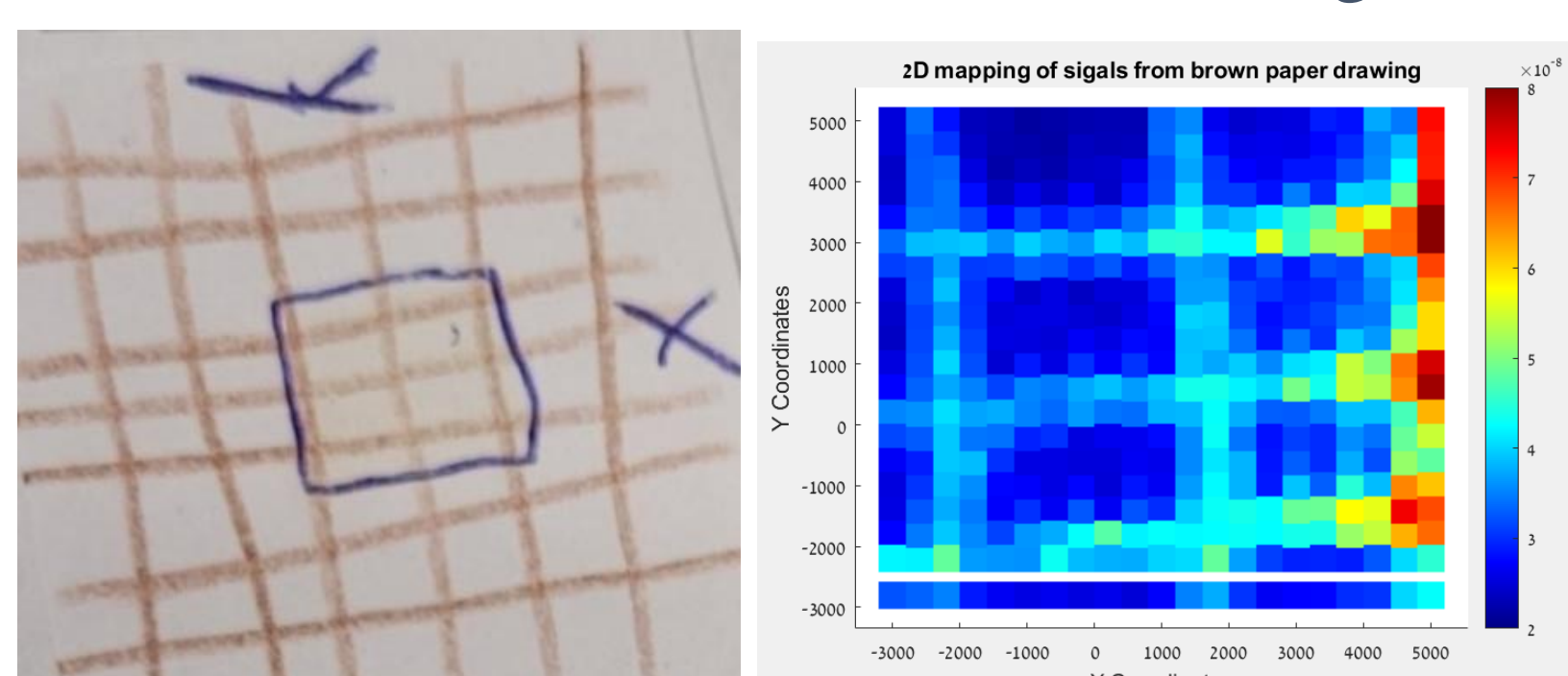


Fig.4: 2D MEES scanning of a pattern drawn on paper using brown pencil, at laser wavelength of 213.0 nm.

Pharmaceuticals

MEES can be used for identification of medications and for detection of degradation products. Thus, it can determine aging processes and expiry of medications.

MEES Spectra of Various Drugs

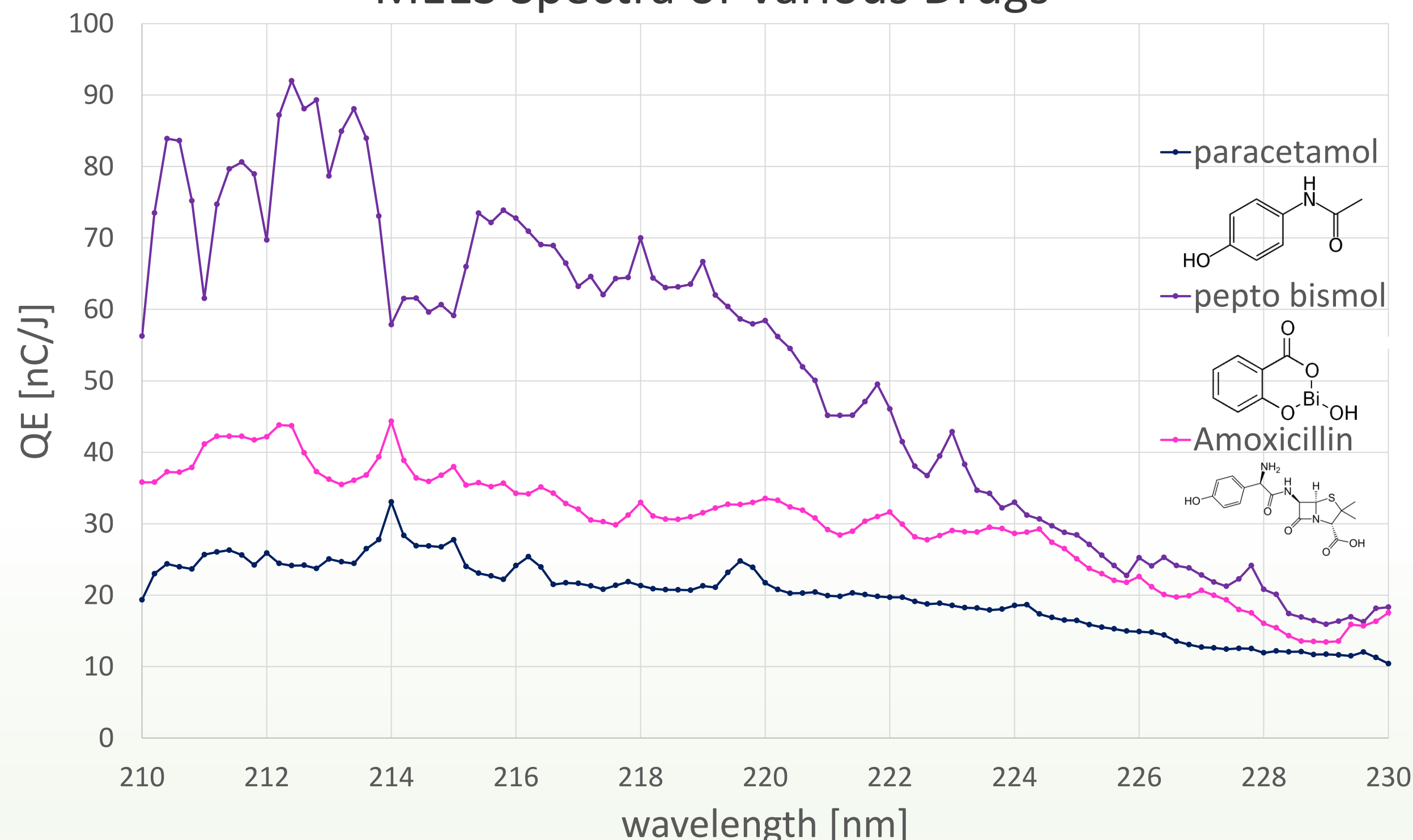


Fig. 5: MEES spectra of PB, Amoxicillin, and Paracetamol.

MEES spectra of PB And Degraded PB

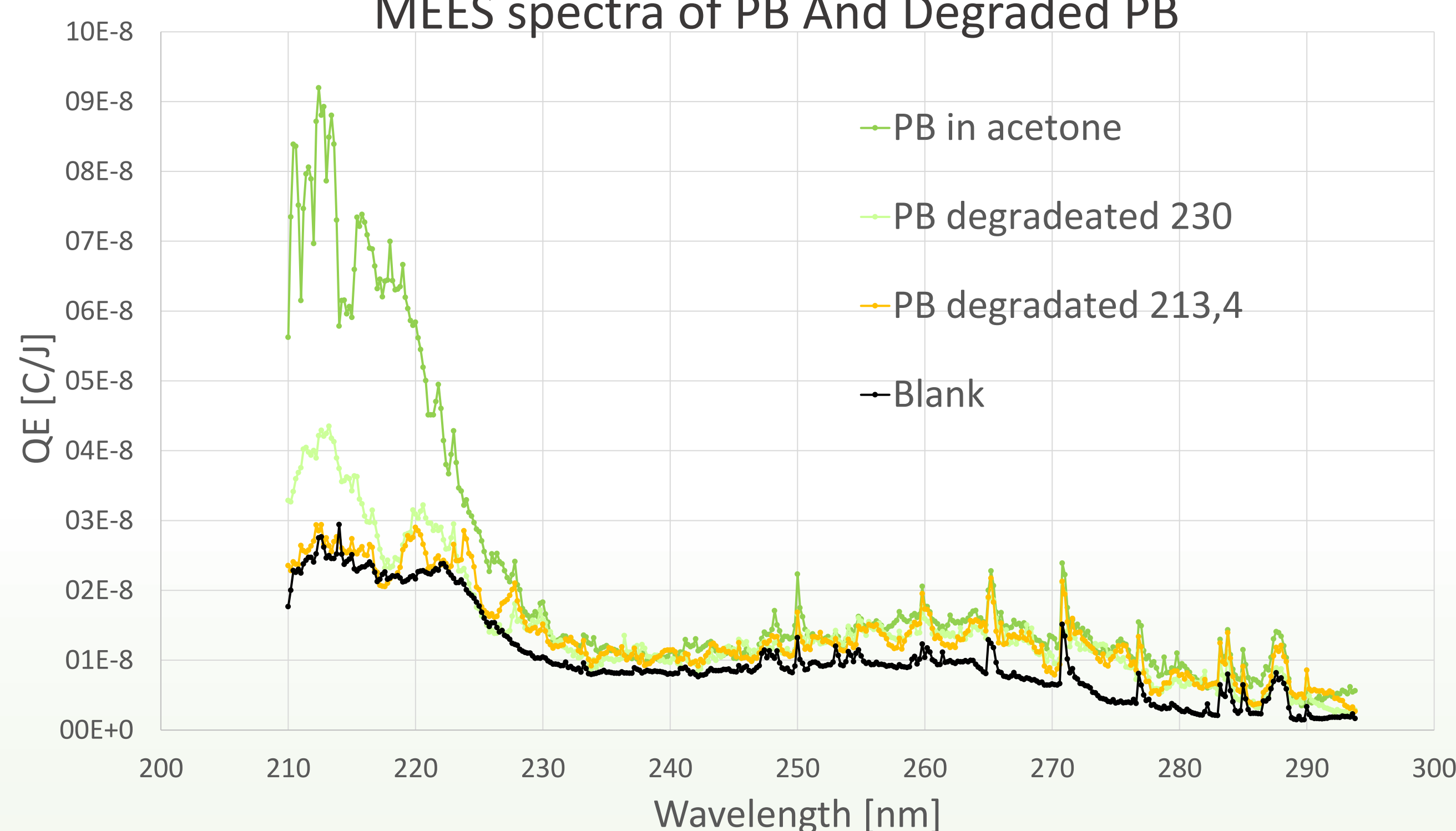


Fig.6: MEES spectra of PB and degraded PB.