Polypyrro-derivates nano-gravimetric sensors for the Libra Nose application to the essential oil discrimination.

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A novel series of nano-gravimetric sensors are obtain from the deposition of new polypyrrole derivates compound (Fig.1), on the oscillating quartz surface. In fact these polymers are used to modify the surface of the transductor with some functional chemical groups with affinity for a great class of volatile organic and inorganic compounds.

Eight 20 MHz resonant Quartzes coated with a series of polymer opportunely modified via an easy polymerisation in situ. for to obtain an array of sensors with different functional group surface, and as an effect there are different interactions between analythe and polymer. The quartz crystal used as mass transductor, with fundamental oscillation frequency of 20 MHz. are AT- cut with gold surface. The sensors obtained are applied in a electronic nose system (Libra-nose) developed by Technobiochip for the determination of gas compound analytes.

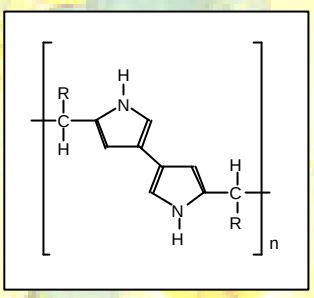

Fig.1

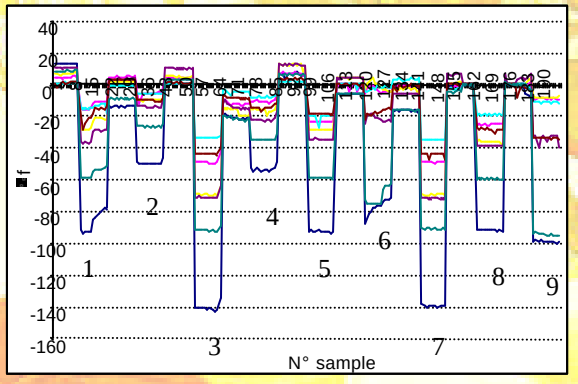

Fig.2

In fig.2 it is possible to see typical sensors signals of the quartzes microbalance transducer coated with poly-pyrroderivates as a function of number acquisition for several essential oil. 1,5,8) lavender essential oil. 2,4) eucalyptus essential oil. 6,9) rosemary essential oil. 3,7) lavender +eucalyptus essential oil. It is evident that the sensors signals are completely reversible, which proves the weak bond between the analyte and the sensors matrix. In fact the sensor's signal after the acquisition time, recovers in a few minutes the initial frequency.

The data obtained from the acquisitions in fig. 2 have been treated with a Principal Component Analysis (PCA) see Fig.3 From the data obtained with the PCA (Principal Component Analysis), it results that the selected and tested nano-gravimetric sensors are able to discriminate the different essential oils and the lavender-eucalyptus mix. The first and the second principal component are sufficient at a 97.5% level to explain the variant

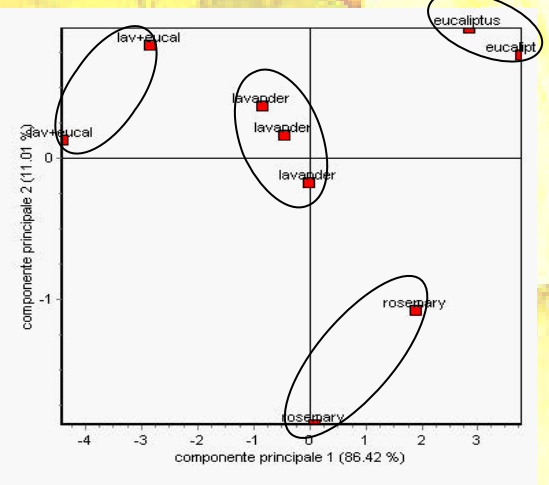

Fig.3

CONCLUSIONS: From acquisitions and Principal Component Analysis (see above) we can say that this series of analysed polymers - made by Technobiochip - have the capacity to adsorb organic molecules in gaseous phase. These molecules present some advantages if confronted with traditional receptor molecules: an easy synthesis, they are more resistant because the polymer shows a strong bond with surface of gold electrode (this bond was not studied yet).

Besides, the array of selected polypyrro-derivate sensors show to have an high capacity to discriminate different kind of essential oils.