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ISTITUTO NANOSCIENZE CONSIGLIO NAZIONALE DELLE RICERCHE

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Pisa, 19/07/2012

Dear Company,

following the measurements we made according to Contracts N. 0001554 of 06/04/2012 and N. 0002206 of 03/05/2012 stipulated between CNRNANO Nanoscience Institute and Nanobionic Ltd "Optical characterization of Nanobionic tissue samples in the IR wavelength interval extending from 4 to 14 μm" and reported in the official paper from our institute, this is to

certify

that all the Nanobionic samples have very high emissivity, in particular in the same wavelength region it has been measured an emissivity between 95% and 99%, showing the positive effects of the bioceramic included in the analyzed tissue samples.

Kind Regards,

Prof. Mauro Tonelli

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OPTICAL CHARACTERIZATION ON TISSUE SAMPLES IN THE SPECTRAL RANGE EXTENDING FROM 4 μm TO 14 μm.

Contracts CNRNANO N. 0001554 dated 06/04/2012 and N. 0002206 dated 03/05/2012.

According to Contracts N. 0001554 of 06/04/2012 and N. 0002206 of 03/05/2012 stipulated between CNRNANO Nanoscience Institute and Nanobionic Ltd here is reported the optical characterization of Nanobionic tissue samples in the IR wavelength interval extending from 4 to 14 μm.

As first step, scheduled at point 1 of the contract, the measurement system has been adjusted: a spectrometer with a MCT/A detector, sensitive from 0.8 to 35 μm, was installed and a related software was developed to control the whole system. This measurement system has been aligned and calibrated with a black body source at T=37 °C in the spectral range extending from 4 to 14 μm.

As second step, scheduled at point 2 of the contract, each sample has been measured at T=37 °C.
A heating element was used both as black body source and as oven to warm the samples. Both the black body source and the samples were mantained at the fixed temperature of 37 °C by a thermostatation system whose temperature controller has been tested before measurements.
Emission spectra are recorded for each sample kept at the temperature of 37°C. .
A measure on each sample was made in 3 different days to test the reproducibility of the result. The samples were tested for a total of 21 measurements.

In Fig.1-Fig.7 is reported the spectral radiance and in Fig.8- Fig.14 is reported the emissivity value of the 7 samples named:

Sample n.1: vest
Sample n.2: t-shirt
Sample n.3: black socks
Sample n.4: blue socks
Sample n.5: stockings
Sample n.6: brown socks
Sample n.7: black&white socks

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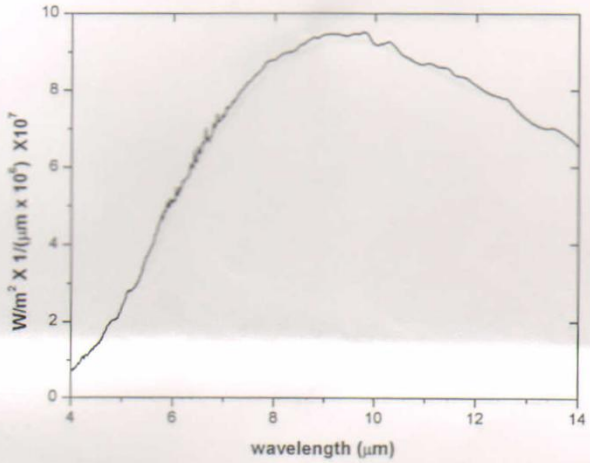

Fig. 1 Emission spectrum of sample n.1 (vest) at T=37°C.

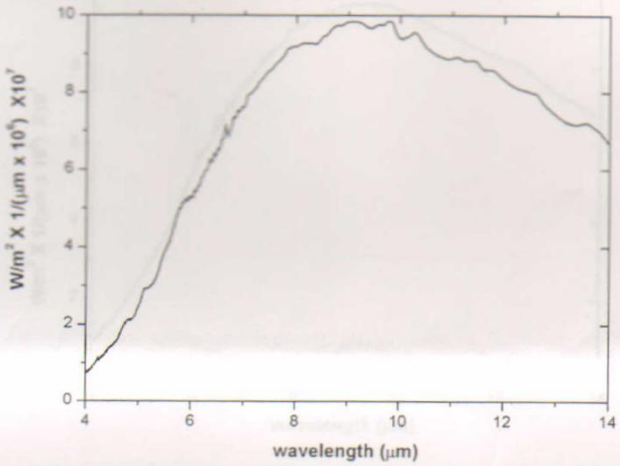

Fig. 2 Emission spectrum of sample n.2 (t-shirt) at T=37°C.

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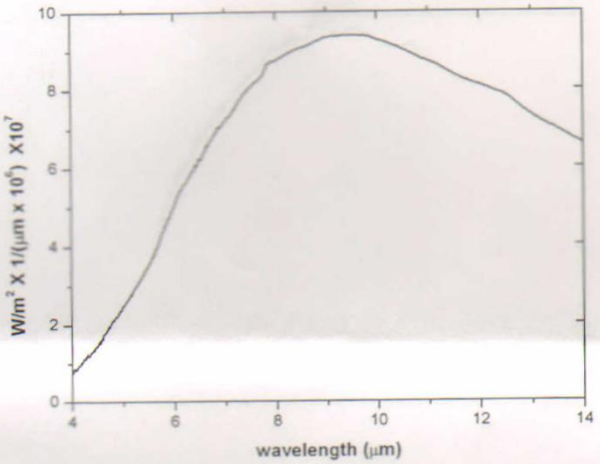

Fig. 3 Emission spectrum of sample n.3 (black socks) at T=37°C.

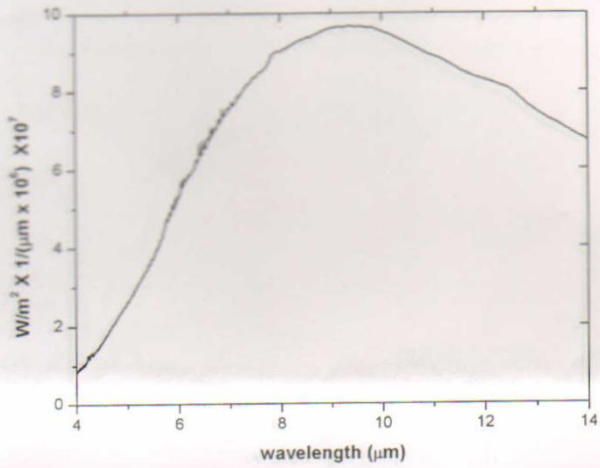

Fig. 4 Emission spectrum of sample n.4 (blue socks) at T=37°C.

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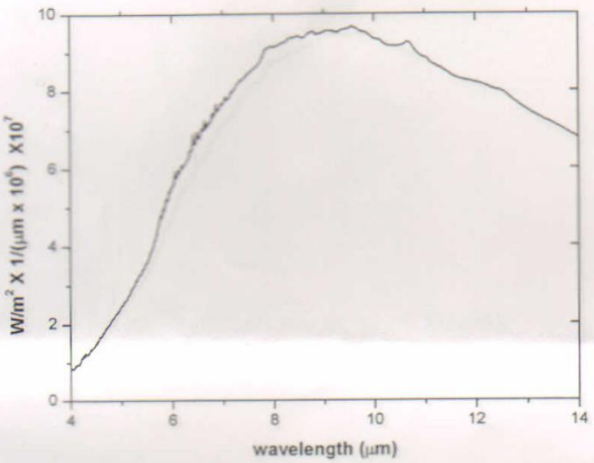

Fig. 5 Emission spectrum of sample n.5 (stockings) at T=37°C.

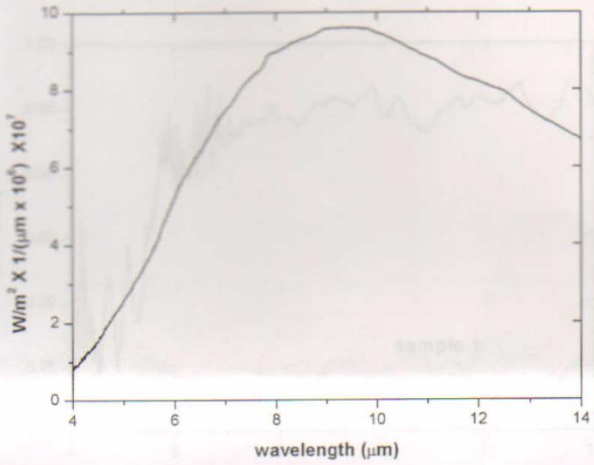

Fig. 6 Emission spectrum of sample n.6 (brown socks) at T=37°C.

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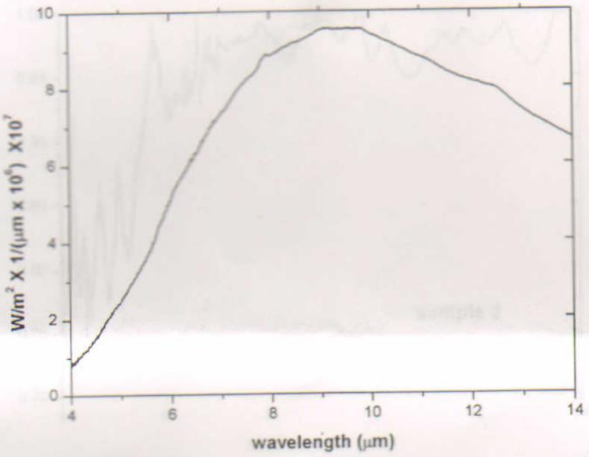

Fig. 7 Emission spectrum of sample n.7 (black&white socks) at T=37°C.

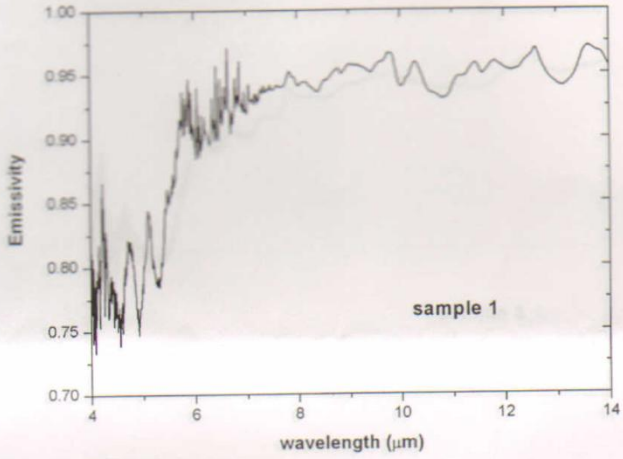

Fig. 8 Sample n.1 (vest) emissivity as function of λ..

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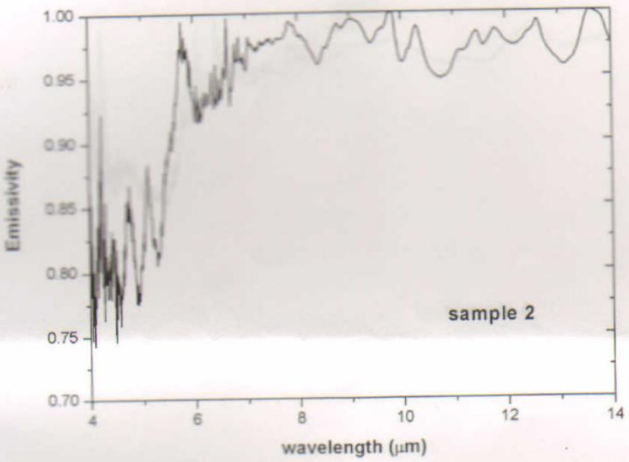

Fig. 9 Sample n.2 (t-shirt) emissivity as function of λ.

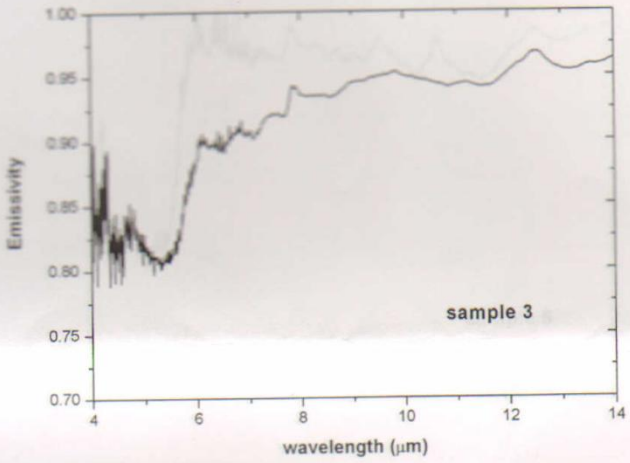

Fig. 10 Sample n.3 (black socks) emissivity as function of λ.

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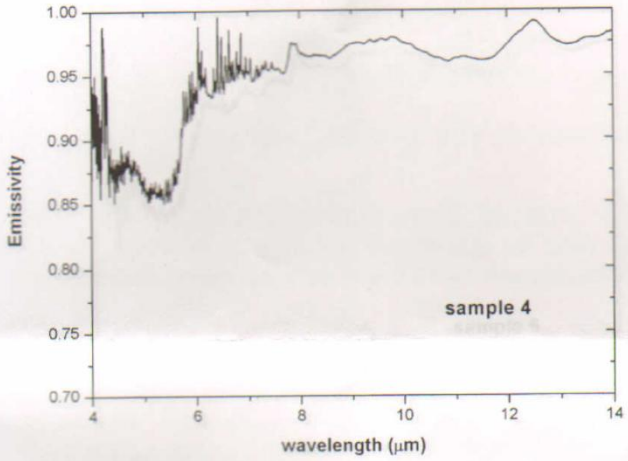

Fig. 11 Sample n.4 (blue socks) emissivity as function of λ.

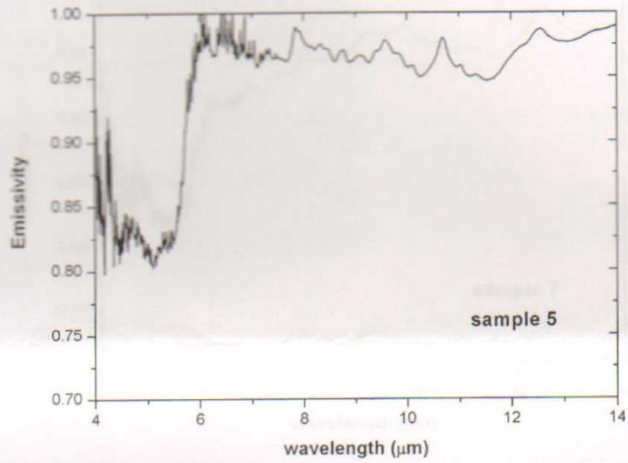

Fig. 12 Sample n.5 (stockings) emissivity as function of λ.

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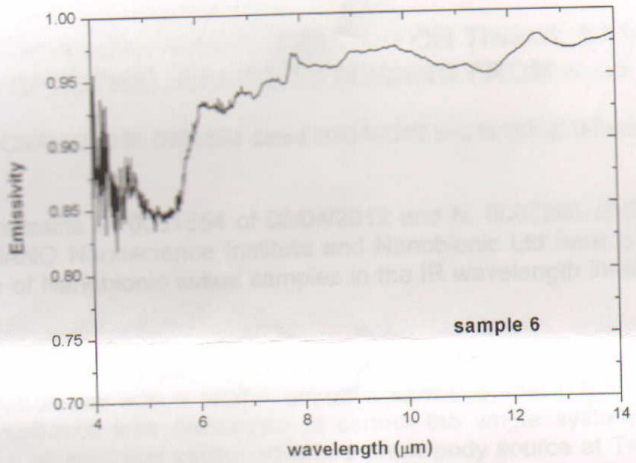

Fig. 13 Sample n.6 (brown socks) emissivity as function of λ.

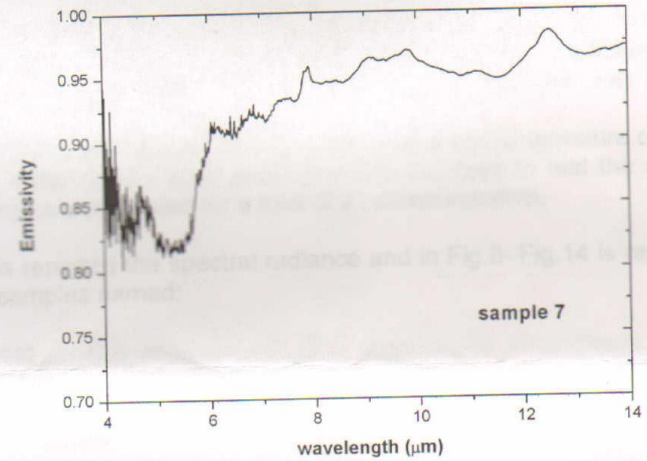

Fig. 14 Sample n.7 (black&white socks) emissivity as function of λ.

04/05/2012

Prof. Mauro Tonelli

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