

## Electronic Supplementary Information to

### A Hybrid Material Assembled by Anthocyanins from Açai Fruit Intercalated between niobium lamellar oxide

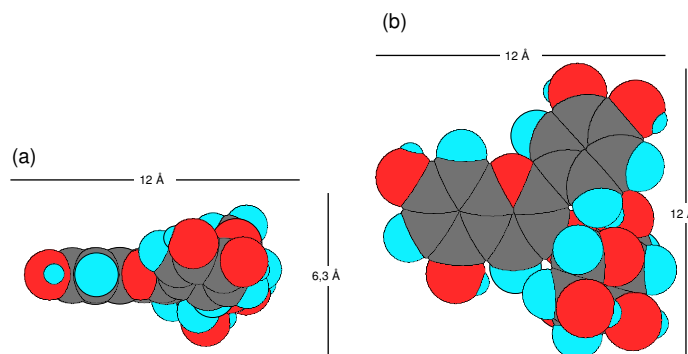
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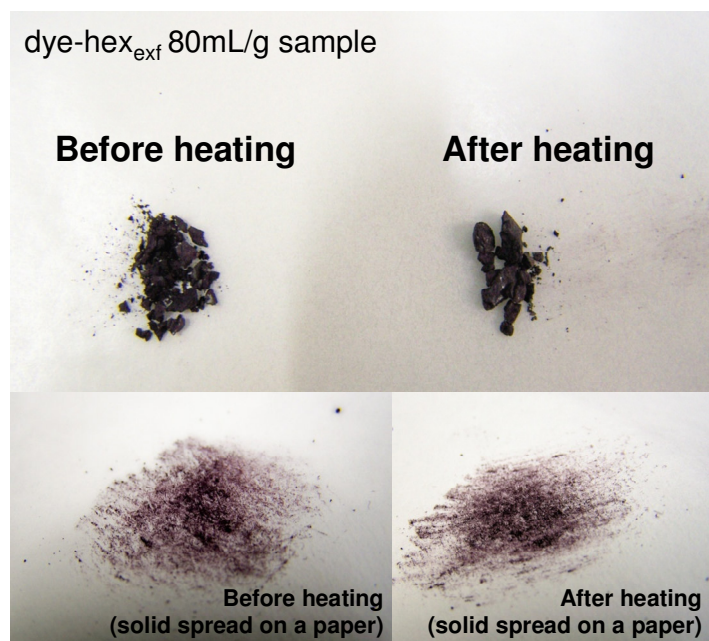
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Cyanidin-3-glucoside molecule possesses dimensions of 12 x 6.3 x 12 Å (Fig. S1) when in its most stable configuration (simulation carried on with the aid of Chem3D software, from CambridgeSoft Corp., using MM2 method).



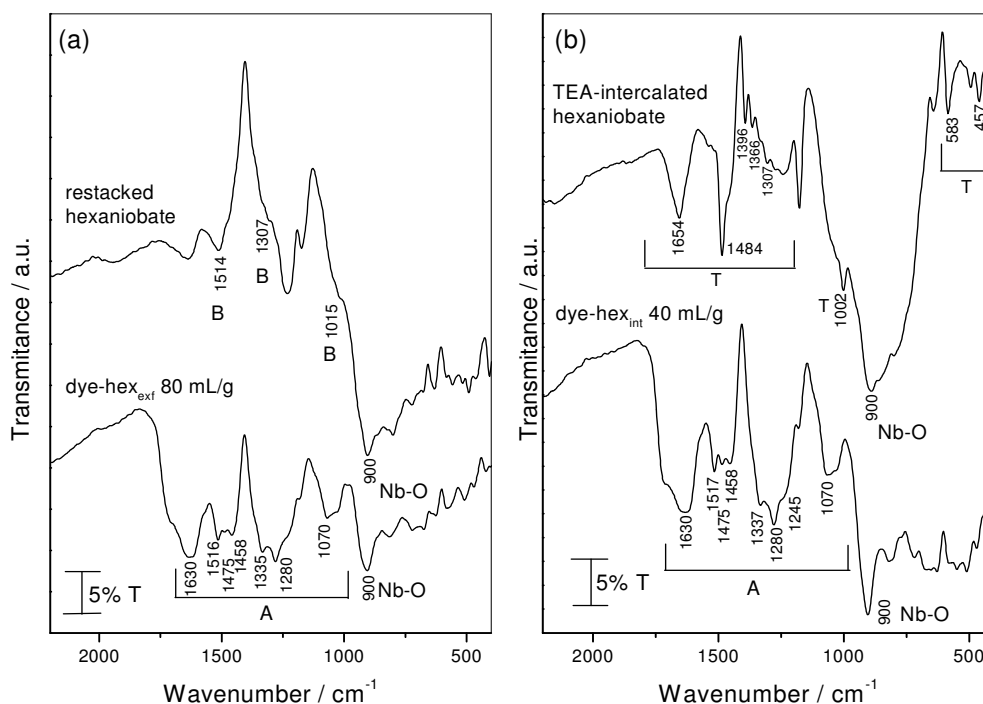
**Fig. S1.** Space-filling models of the cyanidin-3-glucoside molecule in its most stable configuration.

Fig. S2 shows pictures of dye-hex<sub>exf</sub> 80mL/g sample before and after heating process at 170°C under air atmosphere in the TG-DSC furnace (Netzsch thermoanalyser model TG/DSC 490 PC Luxx). No color changes were observed.



**Fig. S2.** Pictures of dye-hex<sub>exf</sub> 80mL/g sample before (left) and after (right) heating process at 170°C under air.

Fourier transform infrared spectra (FTIR) were recorded on a Bomem spectrophotometer, model MB-102, with a reflectance accessory; the samples were diluted in solid KBr. FTIR spectra of dye-hexaniobate samples are presented in Fig. S3. The spectra of both dye-hex<sub>ext</sub> sample (Fig. S3a) and dye-hex<sub>int</sub> material (Fig. S3b) are very similar, although the spectra of their precursors are very different between them.

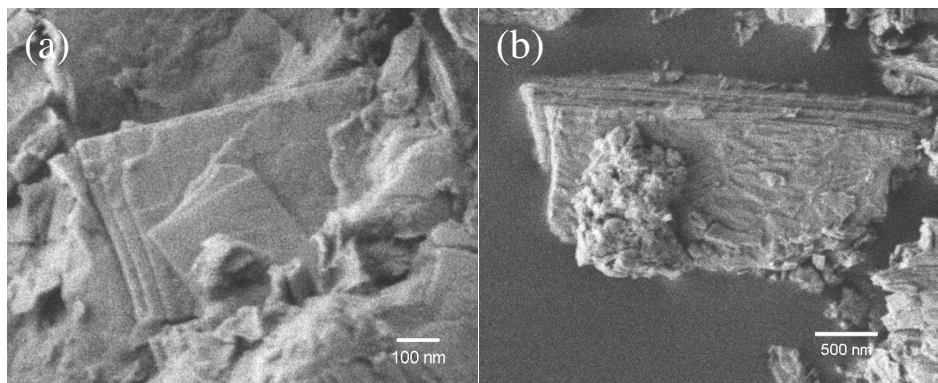


**Fig. S3.** FTIR spectra of (a) dye-hex<sub>ext</sub> sample and (b) dye-hex<sub>int</sub> sample. For comparison purposes, FTIR spectra of their respective precursors are also shown

The bands at about 1070  $\text{cm}^{-1}$  ( $\delta_{\text{C-H}}$ ), 1245 and 1280  $\text{cm}^{-1}$  ( $\nu_{\text{C-O}}$  from phenols), 1335  $\text{cm}^{-1}$  ( $\nu_{\text{C-C inter-ring}}$ ), 1458, 1475, 1516 and 1630  $\text{cm}^{-1}$  ( $\nu_{\text{C-C}}$  from ring stretching) are due to anthocyanin group (marked with A) and are in agreement to the FTIR spectra of some hydroxyflavylium derivatives previously reported.<sup>1</sup> FTIR spectra of hybrid samples also show absorption bands that can be correlated to sugar units such as glucose.<sup>2</sup> The absorption band at 900  $\text{cm}^{-1}$  ( $\nu_{\text{Nb-O}}$ ) and in the 500-700  $\text{cm}^{-1}$  range are assigned to the inorganic phase.<sup>3,4</sup> Bands marked with B and T are due to n-butylamine or TEA<sup>+</sup> cations in

the precursors samples respectively (Fig. S3).

Field emission scanning electron microscopy (FEG-SEM) images of carbon coated samples were obtained in a JEOL microscope, model JSM-7000F, at the Instituto de Química (Universidade de São Paulo - USP). FEG-SEM images of dye-hexaniobate hybrids (Fig. S4) reveal the presence of platelets in a face-to-face array in both dye-hex<sub>ext</sub> (Fig. S4a) and dye-hex<sub>int</sub> (Fig. S4b) samples. This kind of morphology corroborates the supposition that exfoliated hexaniobate layers are restacked when in presence of the cation dye, leading to a face-to-face oriented layered material with morphology similar to that observed for dye-hex<sub>int</sub> sample.



**Fig. S4.** SEM images of (a) dye-hex<sub>ext</sub> 80mL/g sample and (b) dye-hex<sub>int</sub> sample.

## References

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