Optical characterization of phthalocyanine compounds at different pH

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Phthalocyanines were discovered at the beginning of the XX century by Brown and Tchernic; they are macrocyclic compounds with alternating nitrogen and carbon atoms forming a ring. The structure is constituted by eight azoto and carbon atoms linked by a double conjugated structure [1]. Between the most important properties of phthalocyanines are the high thermal and chemical stability and interesting optical properties [2]. The spectroscopic characteristics are provided by the high electron density, due to the 18 π electrons, of the macrocyclic ring of these compounds. The UV-Vis of the spectrum has characteristic features, with high intensity absorption, resulting in colored compounds. Conformational changes may result in spectral modifications, like shift of the bands, resulting in color changes of these compounds [2]. This work focuses on the optical properties of the nickel tetrasulphonated phthalocyanine at different pH. Figure 1 shows the UV-Vis spectrum of NiTsPc at different pH. The UV-vis optical absorption bands between 550 and 700 nm with a shoulder are related to the Q bands. The features between 400 and 200 nm are related with the B transitions, where the electron cloud is open, are more susceptible to interact with the solvent. However, it is not clear this interaction, since just the relative concentration of OH and H is changing.

Acknowledgments: UFPI, FAPEPI, CNPq, CAPES, FINEP, INEO

Table 1: The linear coefficient (b)

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<th>λ (nm)</th>
<th>b_{pH=2}</th>
<th>b_{pH=3}</th>
<th>b_{pH=4}</th>
<th>b_{pH=6}</th>
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<td>615</td>
<td>(1)</td>
<td>(1)</td>
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<tr>
<td>336</td>
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<td>270</td>
<td>(3)</td>
<td>(3)</td>
<td>(3)</td>
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Figure 1: UV-Vis spectrum of NiTsPc in different pH.

References