

The "breathing" of corrole ring

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Corrole has been one of the first porphyrinoids reported in the literature, prepared on the wave of the researches focused on the definition of a synthetic route to Vitamin B12. This macrocycle shares with corrin the molecular framework and with porphyrin the 18-electrons π -aromatic system.

Corrole has recently received an impressive boost in researches, because it has shown some peculiar properties, different from those of the corresponding porphyrins, which are promising for practical applications.

Studies of corrole chemistry have led to a better understanding of structure-properties relationships, which is one key step in the designing of new materials targeted for different applications. We have been interested to study the possible synthetic modifications of the corrole framework, with the aim to tune the properties of the resulting macrocycle to the corresponding application, such as for example the exploitation as sensing material in chemical sensor. Among the various functionalizations the fusion of benzene or others aromatic moieties onto the β,β' -positions of the corrole macrocycle has attracted particular interest, because this process results in a significant modification of the compound optical features, due to the expansion of the macrocyclic aromatic π -system. We have prepared and characterized different metal complexes of these derivatives, investigating the electrochemical and photophysical behavior.

Another interesting feature of the corrole ring is related to its ability to switch between different macrocycle structures, leading by a ring-expansion to porphyrins or hemiporphycene derivatives. These examples demonstrated that the corrole skeleton is not a rigid block and can be modified even after its formation, and it become evident that these interconversions are not occasional, but rather are quite general and can be exploited for the preparation of macrocycles that may be difficult to prepare by direct or previously designed routes.

In the present work we summarise our recent achievements in the modifications of corroles, showing the promising results for chemical sensors applications.