# TAILOR-MADE METALLOPORPHYRINS FOR HYBRID MOLECULAR ELECTRONICS

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A few examples of metalloporphyrins used as discrete storage media in hybrid electronic devices are found in the literature [1, 2]. Redox molecules are particularly interesting because it is believed that they could allow the fabrication of devices with low write/erase voltage and smaller dimensions. Moreover, the ability of metalloporphyrins to reversibly convert between two redox states could be exploited to tune the different electrical states of the transistor. Such an approach is actively followed in our laboratories.

One of our current research projects is to anchor metalloporphyrins on Si by covalent Si – C bonding for the fabrication of specifically designed silicon-based devices. The different steps of the development of these devices can be divided in three major areas: (i) molecular chemistry, (ii) surface chemistry and (iii) microelectronic technology. Indeed, it is first necessary to synthesise the redox active molecules (i) and to build the base of the device (iii), and then the charge-storage elements are grafted on the device (ii).

So far our design of the molecules has been governed by two criteria: the first one is the capability of the molecule to exist in different redox states, and the second one is its ability to be grafted on the Si surface. During this project we have developed a very efficient indirect grafting technique based on a “click-chemistry” reaction [3,4]. The molecule we synthesize must therefore bear appropriate functions to undergo this grafting. In this poster the requirements regarding the porphyrins design will be presented.

**References:**

[1] Li C, Ly J, Lei B, Fan W, Zhang D, Han J, Meyyappan M, Thompson M and Zhou C, J. Phys. Chem. B, **108** (2004) 9646.
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**Figures:**