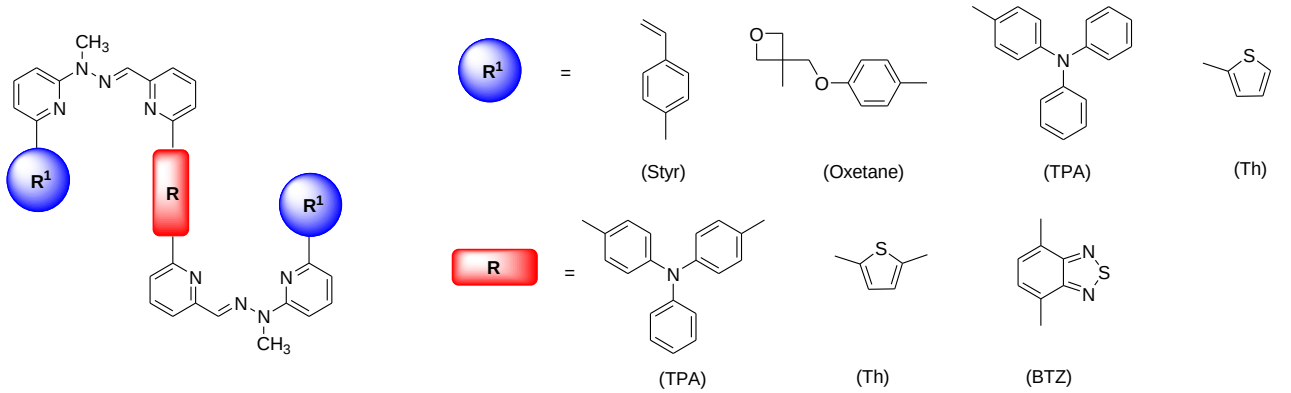
DESCRIPTION FOR THE GENERAL PUBLIC

The scientific purpose of the project entitled "**Metallopolymeric films based on transition metal complexes as active layers for electrochromic applications**" is the synthesis and characterization of new ligands and their supramolecular complexes with transition metal ions, and the investigation of their electrochromic properties and potential applications as active layers in changing color devices.

Electrochromism is defined as the ability of material to reversible changes of color under electric stimulus. Color can be changed from colorless to colored or from one color into another. The investigation of more and more efficient electrochromic compounds exhibiting wide range of colors is very important due to the possibility of their applications as active materials in "smart windows" or dynamic camouflage technologies. The proposed project combine the experience of the principal investigator in coordination chemistry acquired during PhD studies and in synthesis and characterization of electrochromic materials gained during postdoctoral fellowship at Université de Montréal.

The first part of the project involves the synthesis and characterization of twelve new hydrazone ligands:



L[1]: R^1 = styr; R = TPA
L[2]: R^1 = styr; R = Th
L[3]: R^1 = styr; R = BTZ
L[4]: R^1 = oxetane; R = TPA
L[5]: R^1 = oxetane; R = Th
L[6]: R^1 = oxetane; R = BTZ
L[7]: R^1 = TPA; R = TPA
L[8]: R^1 = TPA; R = Th
L[9]: R^1 = TPA; R = BTZ
L[10]: R^1 = Th; R = TPA
L[11]: R^1 = Th; R = Th
L[12]: R^1 = Th; R = BTZ

R groups were chosen to provide the reversible oxidation or reduction of ligands with distinct change of color. R^1 groups are expected to allow of formation of insoluble, stable films on a working electrode surface (glass or PET coated with conductive layer *e.g.* indium-tin oxide - ITO). In the next step, obtained ligands will be used in complexation reactions with different transition metal ions to obtain different kinds of supramoleccular architectures. Obtained compounds will be characterized using standard spectroscopic techniques as well as X-ray crystallography. Complexes will be polymerized on electrode surface by electropolymerization (compounds with triphenylamine (TPA), thiophene (Th) and styrene (Styr) as terminal R^1 groups) or spray-coated on subatrate and polymerized thermally (styrene derivatives (Styr)) or photopolymerized (oxetane derivatives (Oxetane)). Electrochromic properties of obtained materials will be investigated in both solution and as thin films by gradual applying of positive or negative potential and measurements of absorption spectra in the visible and near infrared region. Changes of color during electrochemical oxidation or reduction can be due to oxidation/reduction of ligand molecules or changes of oxidation state of metal ion.

Compounds were designed to exhibit wide range of colors depending on the transition metal ion and its oxidation state as well as high color contrast between neutral and oxidized species, and high stability.