

PhD proposal

Strengthening and deacidification of cellulosic objects of the cultural heritage using polyaminoalkylalkoxysilanes. Application to library collections

Research will be carried out at **CRCC** (Center for Research on Conservation, National Museum of Natural History, CNRS) (<http://crc.mnhn.fr>) and **LPPI** (Laboratory of Physico-Chemistry of Polymers and Interfaces, University of Cergy-Pontoise) (<https://www.u-cergy.fr/fr/laboratoires/lppi.html>)

Mission

Acidity is a major problem for the preservation of paper based collections. Late 19th and early 20th century paper collections are sometimes of mediocre quality, especially newspaper. Because of their acidity and brittleness their access is often very restricted. CRCC and LPPI have developed novel treatments based on the use of copolymerized aminoalkylalkoxysilanes (AAAS) that allow the simultaneous deacidification and strengthening of paper. The PhD shall pursue this work by studying the interactions between the treatment and its substrate using solid state NMR, SEM-EDX and nano-FTIR spectroscopy. In order to adapt the treatment formulation to a large variety of materials often present in library collections, the chemical and time stability of the document-treatment system will be investigated. Adapted artificial ageing methods will be developed to that purpose. A large range of naturally aged previously treated papers is available as well for evaluation. The formulation of the treatment will be optimized to adapt to other materials present in library collections in association with paper such as bindings, adhesives, inks and other graphic media. The use of antioxidants will be evaluated in relation to the treatment efficiency (mechanical testing, chemical properties). In order to test the treatment on real documents with varied and complex composition, items from the French National Library, our project partner, will be treated and evaluated.

Requirements

The preferred candidate has recently finished a Master's degree in chemistry (organic chemistry, polymer chemistry, material science, analytical chemistry). A strong interest for cultural heritage preservation issues will be an asset. Language skills (French and English) are essential. Being highly motivated and the ability to work in a team will also be important prerequisites. Work will be equally divided in both laboratories (CRCC, LPPI) and a few trips to the French National Library will be planned. The candidate will be enrolled in the Doctoral School of Sciences and Engineering of the University of Cergy-Pontoise.

Supervision

Anne-Laurence Dupont (CRCC), Odile Fichet (LPPI), Isabelle Fabre-Francke (LPPI)

General conditions

- CV
- Cover letter
- Transcripts (MSc and BSc) and copy of the diploma if available

Application deadline

September 1, 2017

Contacts

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