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Abstract Formulary

Presentation type: **Oral** ☐ **Poster** ✔

Title: SPIROPYRAN-BASED POROUS POLYSILSESQUIOXANES WITH ION SENSING PROPERTIES FOR COLORIMETRIC ANALYSIS

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ABSTRACT (Space limited to 2200 characters)

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Dynamic materials comprising spiropyrans have emerged as one of the most interesting and promising class of stimulus-responsive materials. A prerequisite for the design of stimuli-responsive devices, often also referred to as “smart materials”, is the incorporation of responsive entities into a matrix that does not restrict the conformational freedom. In our previous work, we demonstrated that a silylated spiropyran derivative can be covalently incorporated into ultralight silsesquioxane-based bulk materials by a two-step co-condensation sol -gel approach.[1] The special feature of these organic molecules is their ability to undergo isomerization reactions at external stimuli, e.g. light, heat or pH changes. Spiropyrans can exist in two states. The ring-closed (SP) form contains a spiro C-O bond and appears to be colorless because of its absorption maximum in the UV region. In comparison, the highly coloured open merocyanine (MC) form has a fully conjugated π-system throughout the molecule. The reversible switchability can effectively alter the surface polarity of the material. Additionally the MC form is able for form unique colored complexes with different metal ions. For this purpose, we prepared monoliths based on two spiropyran derivatives with different chelating groups.[2] The colorimetric response of merocyanine-metal ion (MC-M^{2+}) interactions are investigated, as well as the photoluminescence properties and characteristics of the bulk material.

References

1. Euchler D, Ehgartner CR, Hüsing N, Feinle A (2020) ACS Appl. Mater. Interfaces 12: 47754-47762
2. Fries KH, Sheppard GR, Bilbrey JA, Locklin J (2014) Polym. Chem. 5: 2094-2102