Designing color by dye-nanospace interactions

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Maya blue is a blue pigment developed by Maya civilization (more than 1000 years ago) as a hybrid of a dye (indigo) and a clay mineral (palygorskite), which shows extraordinal stability of the color. Lapis lazuli is another important blue (and other colors) pigment composed of a zeolite with accommodating unstable polysulfide anions (S_n^- not S^{2-}), which was stabilized by the host-guest interaction. Motivated by their surprising stability, research on the understanding of the structure of Maya blue and Lapis lazuli, as well as to design hybrid pigments composed of organic dyes or polysulfide anions with inorganic nanomaterials has been done. Walking along this romantic pavement, some unexpected phenomena have been found in addition to the main target on the development of the novel hybrid pigments for practical uses.

In this lecture, after the brief introduction of inorganic nanospace materials including clay minerals, the expected (and reported) roles of the nanomaterials for color tuning of dyes and other molecular species will be introduced.

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