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A lanthanide complex doped silica thin film for detecting trace chemical toxins[1] JOHN COMO, LOUISA HOPE-WEEKS[2], KELVIN CHENG[3], Texas Tech University — A highly luminescent lanthanide metal–ligand complex was doped into a mesoporous silica sol-gel matrix for the development of a nanosensor to detect trace toxic chemicals. The metal ion Eu^{3+} was coordinated with various organic ligands to produce different self-assembling compounds that exhibit different sensitivity to targeted chemical toxins. Under ultra-violet excitation, the compound exhibited intense, long-lived millisecond phosphorescence with a large Stokes shift. A detector was fabricated by doping a silica sol-gel thin film matrix with the Eu^{3+} compound and was exposed to liquid and gas phase toxins. Upon exposure, the compound underwent fast fluorescence quenching and the emission/source intensity ratio was measured as a function of time for various concentrations of toxins.

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