

# Photocontrolled spin polarization at hybrid organic-ferromagnetic interfaces

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We report a first-principles study of magnetic properties at an organic-ferromagnetic interface by placing light-switchable azobenzene molecules on to a Fe/W(110) surface. Our calculations demonstrate that the magnetic properties of the hybrid interface, such as the local magnetic moment and spin polarization, change significantly as the azobenzene molecule switches reversibly from the *trans* to the *cis* form. The molecule-surface interaction, which determines the feasibility of photo-switching of the azobenzene on the surface, can be altered by chemical functionalization of the molecule. Specifically, we find that substitution of the H atoms with electronegative atoms (such as F) substantially reduces the binding energies of the molecule on the Fe surface. This study suggests a new way to manipulate magnetism by application of light at organic-ferromagnetic hybrid interfaces.

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