CO_2 permeability control in light responsive membranes and 3D structures

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Azobenzene cromophores can be used as functional dyes in smart photocurable formulations for the production of membranes and DLP-3D printed objects. In this work, two different azo molecules have been tested for the fabrication of membranes. Taking advantage of the photoisomerization of these compounds, light induced changes in CO_2 permeability have been studied showing a great increase of gas transmission upon green light irradiation. The investigations showed a linear increase of permeability with the increase of laser intensity, enabling a fine control of gas permeation. Moreover, these materials showed selectivity toward different gases, enabling a great increase of permeation upon laser irradiation for CO_2 but not for O_2. Going a step further, the studied light responsive membranes have been integrated in 3D printed structures; as a proof of concept a smart 3D valve presenting light triggered CO_2 permeability has been built.