

Studies on Photochromic Performance of Derivatives of Fulgide and Application to Recording Materials

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Work on organic photochromic compounds has been attracted much attention because of a high possibility being used as a re-writable recording media. Owing to a highly-thermal fatigue resistant characteristic, a derivative of heterocyclic fulgide has been regarded as an excellent photochromic compound. In this paper, the author reported on a relationship between chemical structure and photochromic performance of fulgide in dilute solution of PMMA thin film and furthermore for practical use a possibility of fulgide disk as a recording media was also mentioned. In absorption spectra properties, it was clarified that an increase in electron-donating ability of heterocyclic or benzilidene structure of fulgide caused a bathochromic shift of the absorption of colored, e.g. photocyclized form of fulgide and some of which showed an enough susceptibility at semi-conductor laser oscillation wavelength (780nm). On the other hand, quantum yield for both coloration and bleaching reaction of fulgides indicated that an increase of an electron-donating ability of the heterocyclic or benzyl structure caused a higher yield for coloration and a novel fulgide showed a highest quantum yield (0.65) in derivatives of fulgide. Thermal stability and cycle fatigue resistance (photochemical stability) of fulgide in PMMA thin film were investigated and it was proved that oxazole structure as a heterocycle of fulgide was effective at improving the both stabilities. An optical fulgide disk was prepared and it was revealed that excellent read-out signal (CNR/49dB) was acquired and a reversible cycle-repeating, e.g. recording and erasing was possible. On the other hand, fulgide film in horography showed 1% of diffraction efficiency (η) and 45dB of S/N value.