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Title:Mail screening applications of terahertz radiation
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Abstract:The aim of this study was to apply terahertz (THz) technology to security applications, and in particular, for screening and identification of drugs-of-abuse in mail. Comparison was made of transmission spectra obtained with both THz time-domain spectroscopy and a tunable THz source, and the effects of sample configuration on the resulting spectra were examined. The utility of diffuse reflectance spectroscopy using a tunable THz source was also examined. A non-invasive mail inspection system targeting drugs-of-abuse and explosives was built, exploiting the ability of THz frequency waves to penetrate packaging materials and the known characteristic absorption spectra of a number of materials of security relevance in this frequency range. The system is composed of two stages: in the first stage, the scattering of a continuous THz wave is used to select mail that contains concealed powder; in the second stage, the absorption spectrum of the suspicious mail is measured and the concealed material is identified via its THz spectrum.
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