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标题: Study of broadband THz time-domain spectroscopy at different relative humidity levels
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摘要: Two detection techniques of broadband terahertz (THz) time-domain spectroscopy-THz air-biased coherent detection (THz-ABCD; from 0.3 to 14 THz) and electro-optical (EO) detection (from 0.3 to 7 THz) - are both performed at several different relative humidity levels. The THz power exponentially decays with the increase in relative humidity. The dynamic range of the main pulse in the time domain linearly decreases as the relative humidity increases from 0% to 40%, and linear fittings show that the slopes are -0.017 and -0.019 for THz-ABCD and EO detection, respectively. Because of the multiple reflections caused by the crystal in the common EO detection, THz-ABCD has better spectral resolution (17 GHz) than that of EO detection (170 GHz). The spectrum of water vapor absorption measured by THz-ABCD is also compared with that measured by the Fourier transform infrared spectroscopy (FTIR).
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