281. Title:Aging explosive detection using terahertz time-domain spectroscopy
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Abstract: Detecting the aging situation of stock explosive is essentially meaningful to the research on the capability, security and stability of explosive. Existing aging explosive detection techniques, such as scan microscope technique, Fourier transfer infrared spectrum technique, gas chromatogram mass spectrum technique and so on, are either not able to differentiate whether the explosive is aging or not, or not able to image the structure change of the molecule. In the present paper, using the density functional theory (DFT), the absorb spectrum changes after the explosive aging were calculated, from which we can clearly find the difference of spectrum between explosive molecule and aging ones in the terahertz band. The terahertz time-domain spectrum (THz-TDS) system as well as its frequency spectrum resolution and measured range are analyzed. Combined with the existing experimental results and the essential characters of the terahertz wave, the application of THz-TDS technique to the detection of aging explosive was demonstrated from the aspects of feasibility, veracity and practicability. On the base of that, the authors advance the new method of aging explosive detection using the terahertz time-domain spectrum technique.