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Title:Empirical study of nonlinearity tensor dominating THz generation in barium borate crystal through optical rectification
Authors:Zhang, Y. (1); Zheng, Y. (1); Xu, S. (1); Liu, W. (1)
Author affiliation:(1) Institute of Modern Optics, Key Laboratory of Opto-Electronic, Information Science and Technology, Nankai University, Tianjin 300071, China
Corresponding author:Liu, W.(liuweiwei@nankai.edu.cn)
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Abstract: The optical rectification is an important optical method to generate the THz wave. However, there is a lack of knowledge about the properties of the nonlinearity tensor which governs the optical rectification process. In this work, we demonstrate that some key information of the nonlinearity tensor of barium borate (BBO) crystal could be revealed by 2-dimensional time-domain spectroscopic measurements. The experimental results indicate that d 22 of the nonlinearity tensor coefficients of BBO crystal plays negligible role during the THz generation by optical rectification. At the same time, a proportional relationship among three other nonzero nonlinearity tensor coefficients, i.e., d 33, d 31, and d 15, could be obtained empirically. It is worth noting that our method is also applicable to similar nonlinearity study in THz region of other types of crystals.
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