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Abstract: Due to the unique properties of terahertz waves, terahertz technology has been used in biomedicine, food inspection, environmental monitoring, security counter-terrorism and other fields concerning national economic and social development. High power broadband terahertz radiation and detection source material is needed to solve related problems urgently as the base of terahertz technology. This paper proposed to use a new kind of terahertz radiation and detection source material——simple processing electro-optic (EO) poling polymers with big nonlinear coefficient and thermal stability, which can replace the inorganic crystal by optical rectification effect for radiation and strong EO activity for detection. Through the research of polymeric EO performance, we designed and fabricated series of chromophores and polymers with different properties. By adjusting the type and concentration of chromophores, the combination of chromophores with polymer and the polarization process, we can obtain a high EO activity, high thermal stability and low dielectric constant polymer materials. We also use some advanced technology and theory to study the various factors affecting terahertz radiation efficiency.

Keywords: Terahertz radiation and detection, Electro-optic poling polymer, Electro-optic activity, Organic materials