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Abstract: An efficient terahertz (THz) wave generation based on Cherenkov type radiation from non-linear optical (NLO) crystals is presented in this paper. In terms of the THz generation from NLO crystals, it is well known that the high absorptivity and the phase mismatch prevent the effective THz generation. Using Cherenkov type THz radiation, we solved the problems and obtained an advantage that many crystals can be used as THz wave emitters. The successful generation of monochromatic THz waves is demonstrated with wide tunability in the range 0.2 -3.0 THz. We obtained the enhancement factor of about 50 as a result of a suppression of phase miss-matching with surfing configuration for bulk NLO crystal. In addition, using prism-coupled Cherenkov phase-matching (PCC-PM) method with the organic crystal 4-dimethylamino-N-metyl-4-stilbazolium tosylate (DAST), we achieved THz-wave radiation with wide-tunability with no deep absorption features. The obtained spectra did not depend on the pump wavelength.

Keywords: Cherenkov phase matching, LiNbO3, Terahertz, prism-coupled Cherenkov phase-matching (PCC-PM)