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# Domain dynamics regulation in ferroelectric crystals

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In light of the integration requirements of optoelectronic functional devices, the multifunctional optoelectronic crystal lithium niobate has emerged as a crucial matrix material. This development has imposed new demands on crystals, including uniformity of crystal structure, stoichiometric crystals, large diameter, and long equal diameter. Through the innovation of the growth technology of lithium niobate crystal and the upgrading of crystal growth equipment, the growth process technology for high-quality and large-size lithium niobate crystals has been realized, thereby providing high-quality matrix materials for subsequent periodic polarization devices. By conducting in-depth research on the physical mechanism of the microscopic domain structure and domain wall motion of lithium niobate crystal under the influence of a polarized electric field, particularly exploring the coupling between the lattice electronic structure induced by external electromagnetic fields, ionic vibrations, ultrasonic waves, and other mechanical forces and the piezoelectric characteristics of ferroelectric materials, the synergistic effect between the external field and the polarized electric field has been clarified. This has guided the establishment of an efficient periodic polarization technology. A breakthrough has been achieved in the key technology for preparing large-aperture periodic polarized lithium niobate crystals.

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