Description of Additional Supplementary Files

File name: Supplementary Movie 1

Description: This movie demonstrates the conventional crystal-growth process of a blue-phase liquid crystal via direct cooling from the isotropic liquid phase through blue phase II to blue phase I, followed by slow grain merging, spanning several hours. Screenshots are presented in Fig. 2a.

File name: Supplementary Movie 2

Description: This movie demonstrates how a large-area single crystal of blue-phase liquid crystal with body-centered cubic symmetry can be produced in minutes via reverse electrostriction directed assembly (REDA), surpassing the traditional methods in both crystal quality and speed. Screenshots are presented in Fig. 2b.

File name: Supplementary Movie 3

Description: This movie shows the reverse electrostriction directed assembly (REDA) of blue-phase liquid crystal in a cell with spatial temperature gradient. This complements the discussion on the operating temperature of REDA in Supplementary Note 1. Screenshots are presented in Fig. 2.

File name: Supplementary Movie 4

Description: This movie shows how reverse electrostriction can direct the self-assembly of molecules in a blue-phase liquid crystal to form a large-area single crystal with tetragonal symmetry. Screenshots are presented in Fig. 3b. The crystal symmetry is confirmed by the corresponding Kossel diagram shown as the inset in Fig. 3b of the main text.