**Ionic conduction and electric modulus in Li2S–CaS and CaX2 (X = F, Cl, Br, and I) nanocomposites**

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| Fig. S1. The Williamson–Hall plots for (a) Li2S and (b) CaS phase in (100−*x*)Li2S･*x*CaS. |

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| 図形 が含まれている画像  自動的に生成された説明 | |
| Fig. S2. SEM-EDS images for (100−*x*)Li2S･*x*CaS. |

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| Fig. S3. Conductivity isotherms of Li2S at different temperatures ranging from 130 °C to 170 ℃. The solid lines are the fitting as per Jonscher’s power law, i.e., at the dispersive regime. |

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| Table S1. Densities of pellets (*d*­1), theoretical densities (*d*2), and relative denties (*d*1/*d*2) of the (100-*x*)Li2S-*x*CaS (*x* = 10, 20, 30, 50) nanocomposites. *d*1 was caluculated from the volume measured by the dimensions of the pellet. *d*2 was caluculated from theoretical densities of an ideal Li2S and CaS crystal phases. | |
| |  |  |  |  | | --- | --- | --- | --- | | *x* | *d*1 (g cm−3) | *d*2 (g cm−3) | *d*1/*d*2 (%) | | 0 | 1.54 | 1.66 | 93.0 | | 10 | 1.40 | 1.75 | 79.6 | | 20 | 1.59 | 1.85 | 86.3 | | 30 | 1.64 | 1.94 | 84.5 | | 50 | 1.64 | 2.13 | 77.4 | |

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| Fig. S4. The imaginary part of modulus *M*″ versus the frequency of (a) Li2S, (b) 80Li2S･20CaS, (c) 70Li2S･30CaS, and (d) 50Li2S･50CaS at different temperatures. |

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| Fig. S5. A magnified view of the XRD patterns for (a) (100−*x*)Li2S･*x*CaF2, (b) (100−*x*)Li2S･*x*CaCl2, (c) (100−*x*)Li2S･*x*CaBr2, and (d) (100−*x*)Li2S･*x*CaI2. |

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| Fig. S6. An Arrhenius plot of the DC conductivities for 80Li2S･20LiI. |