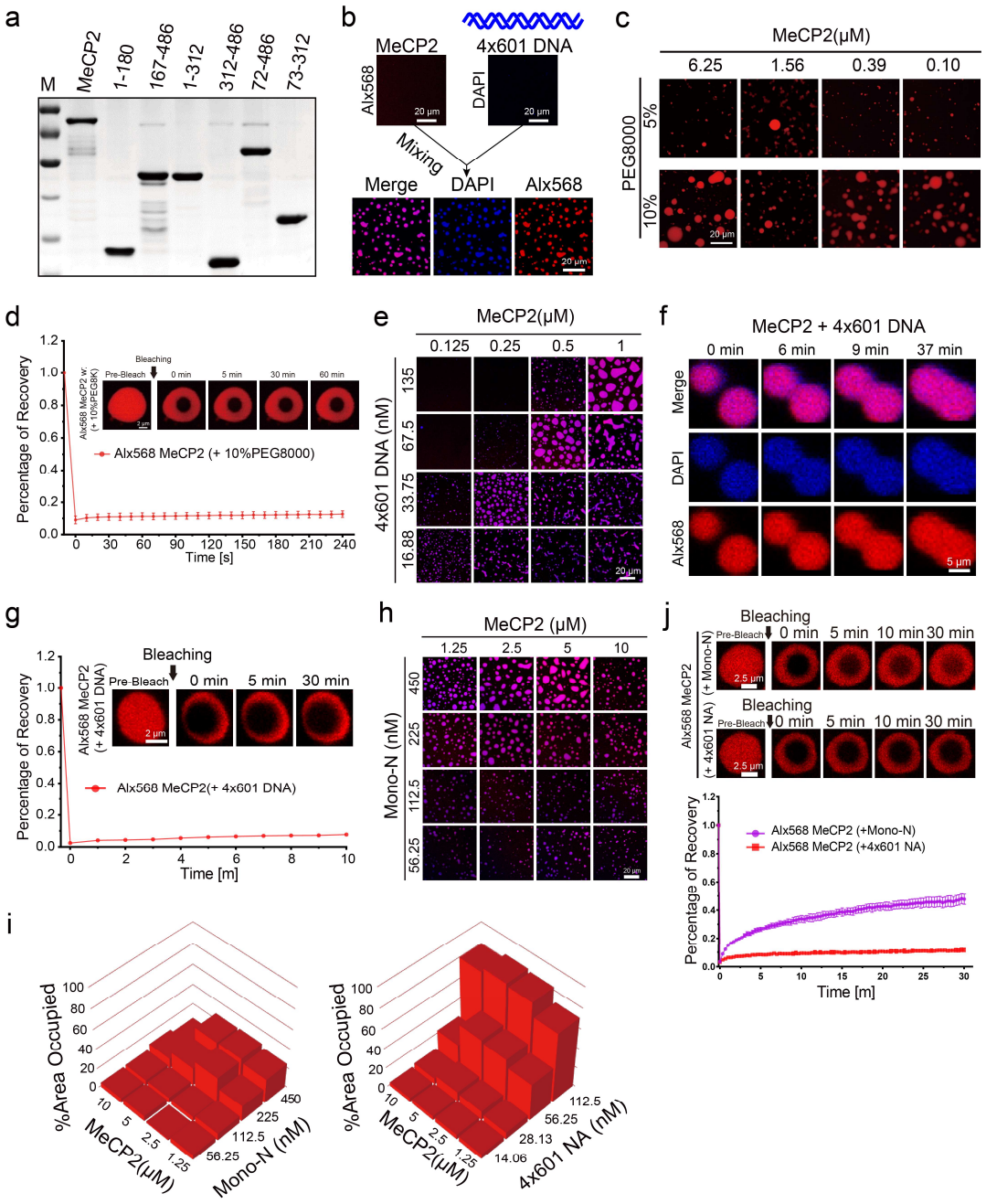

Supplementary information, Fig. S1. MeCP2 drives chromatin compaction and chromatin liquid-liquid phase separation with DNA in vitro.

a SDS-PAGE analysis of purified full-length MeCP2 and its related domain truncations. **b** Top panel, in vitro phase separation assays for MeCP2 protein or 4X177-601 DNA (4xDNA) alone. Bottom panel, puncta formed by MeCP2 protein with 4xDNA in vitro. Scale bars, 20 μm. **c** Phase diagram of MeCP2 with PEG8000. Scale bar, 20 μm. **d** Top

panel, snapshots of a punctum formed by MeCP2 and PEG8000 in Supplementary information, Fig. S1e during FRAP analysis. Scale bar, 2 μm. Bottom, average fluorescence recovery traces of MeCP2 in puncta (n=6). All data are presented as mean ± SD. **e** Phase diagram of MeCP2 with 4xDNA. Scale bar, 20 μm. **f** Fusion of droplets formed by MeCP2 with 4xDNA in S1e upon contact. Scale bar, 5 μm. **g** Top panel, snapshots of a punctum formed by MeCP2 and 4xDNA in Supplementary information, Fig. S1e during FRAP analysis. Scale bar, 2 μm. Bottom, average fluorescence recovery traces of MeCP2 in puncta (n=6). All data are presented as mean ± SD. **h** Phase diagram of MeCP2 with mono-nucleosomes (Mono-N). Scale bar, 20 μm. **i** 3D phase diagrams of MeCP2 with Mono-N or 4xNA in Fig. 1g and Supplementary information, Fig. S1h. **j** Top two panels, snapshots of puncta formed in Fig.1g and Supplementary information, Fig. S1h during FRAP experiments. Scale bars, 2.5 μm. Bottom, average fluorescence recovery traces of MeCP2 in puncta (n=6). All data are presented as mean ± SD.