Figure S1. Hexagonal SmSI-type structure (left) and lanthanide local coordination environment (right) characteristic of the oxyhalides of heavier lanthanides.
Figure S2. A) TEM image with the SAED pattern as an inset for LaOCl nanocrystals prepared using oleylamine via a hot injection method. C) shows the corresponding XRD pattern. B) TEM image with the SAED pattern as an inset of LaOCl nanocrystals prepared using TOPO via a hot injection method, with D) depicting the corresponding XRD pattern.
Figure S3. XRD patterns of A) ErOCl/Er$_2$O$_3$ and B) YbOCl/Yb$_2$O$_3$ prepared in oleylamine (top) and TOPO (bottom).
Figure S4. A) TEM image of ErOCl nanocrystals synthesized using oleylamine as the coordinating solvent. B) SAED pattern of an ensemble of ErOCl nanocrystals. C) TEM image of Er₂O₃ nanocrystals synthesized using TOPO as the coordinating solvent. D) SAED pattern of an ensemble of Er₂O₃ nanocrystals.
Figure S5. A) TEM image of YbOCl nanocrystals prepared using oleylamine. B) Ensemble SAED pattern acquired for a collection of YbOCl nanocrystals. C) TEM image of Yb$_2$O$_3$ nanocrystals prepared using TOPO. D) Ensemble SAED pattern for a collection of Yb$_2$O$_3$ nanocrystals synthesized in TOPO.