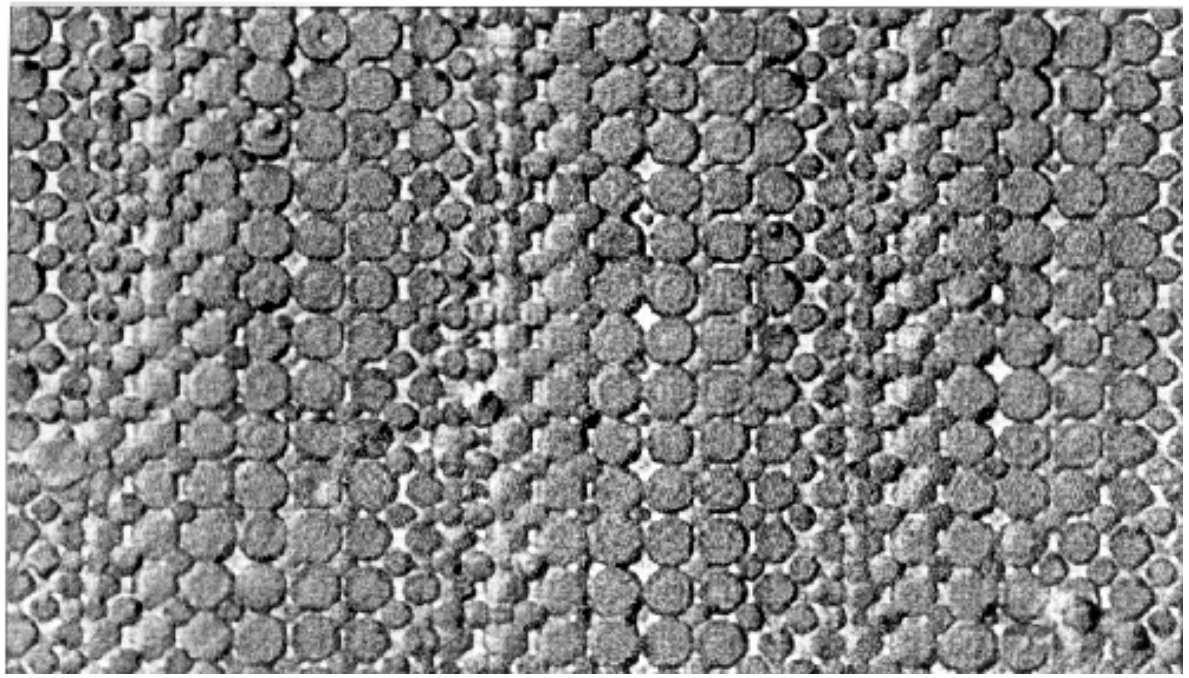
Superlattices (Chris Murray):

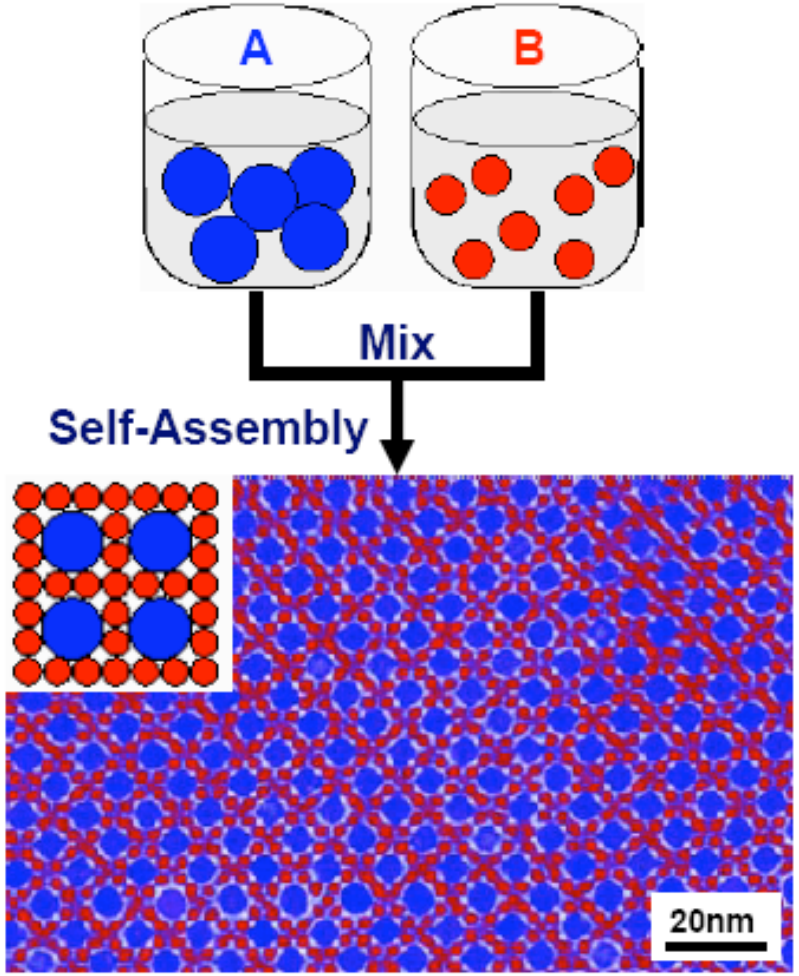
Brazilian Opal



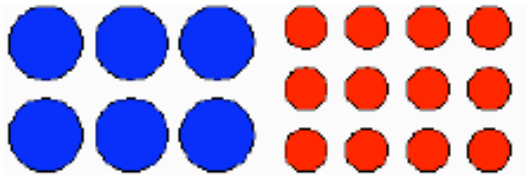
J. V. Sanders, *Phil. Mag. A*, **42** (1980) 705-720.

Consists of large (0.36 μm) and small (0.21 μm) spherical SiO_2 spherical particles which co-crystallize into two binary crystalline phases: AB_2 and AB_{13}

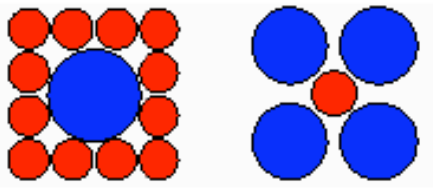
Superlattices (Chris Murray):



1. High Monodispersity

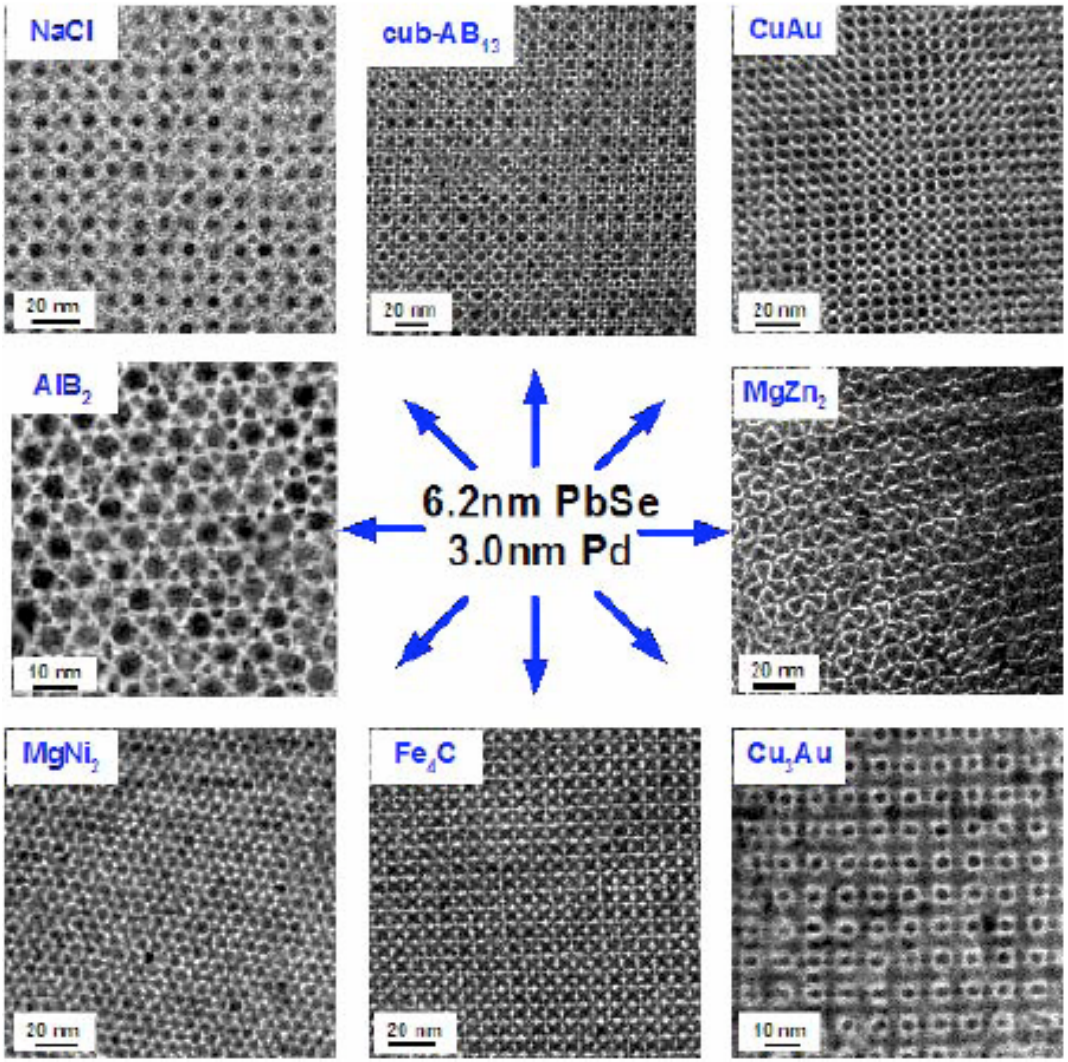


2. Proper A:B Size Ratio



3. Oppositely Charged

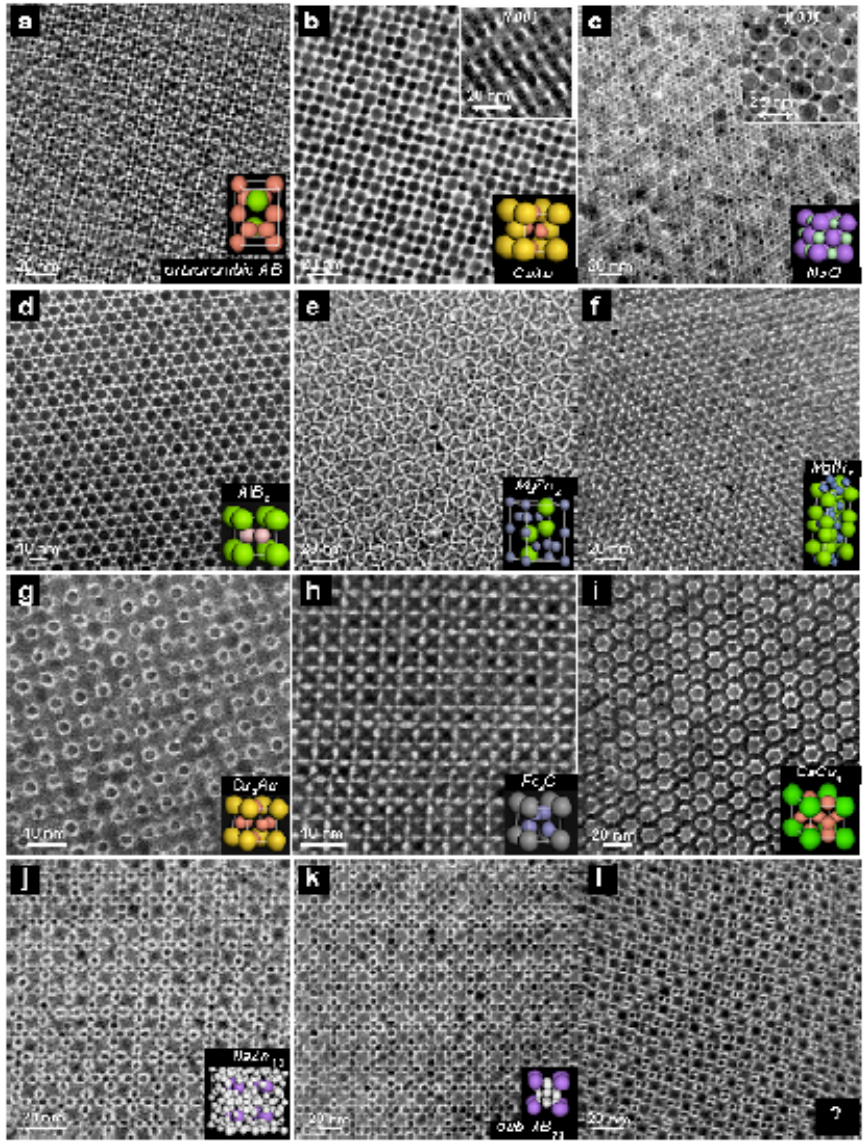
Superlattices (Chris Murray):



TEM images of different BNSL self-assembled from the same batches of 6.2 nm PbSe and 3.0 nm Pd nanoparticles

Changing ratios.

Superlattices (Chris Murray):

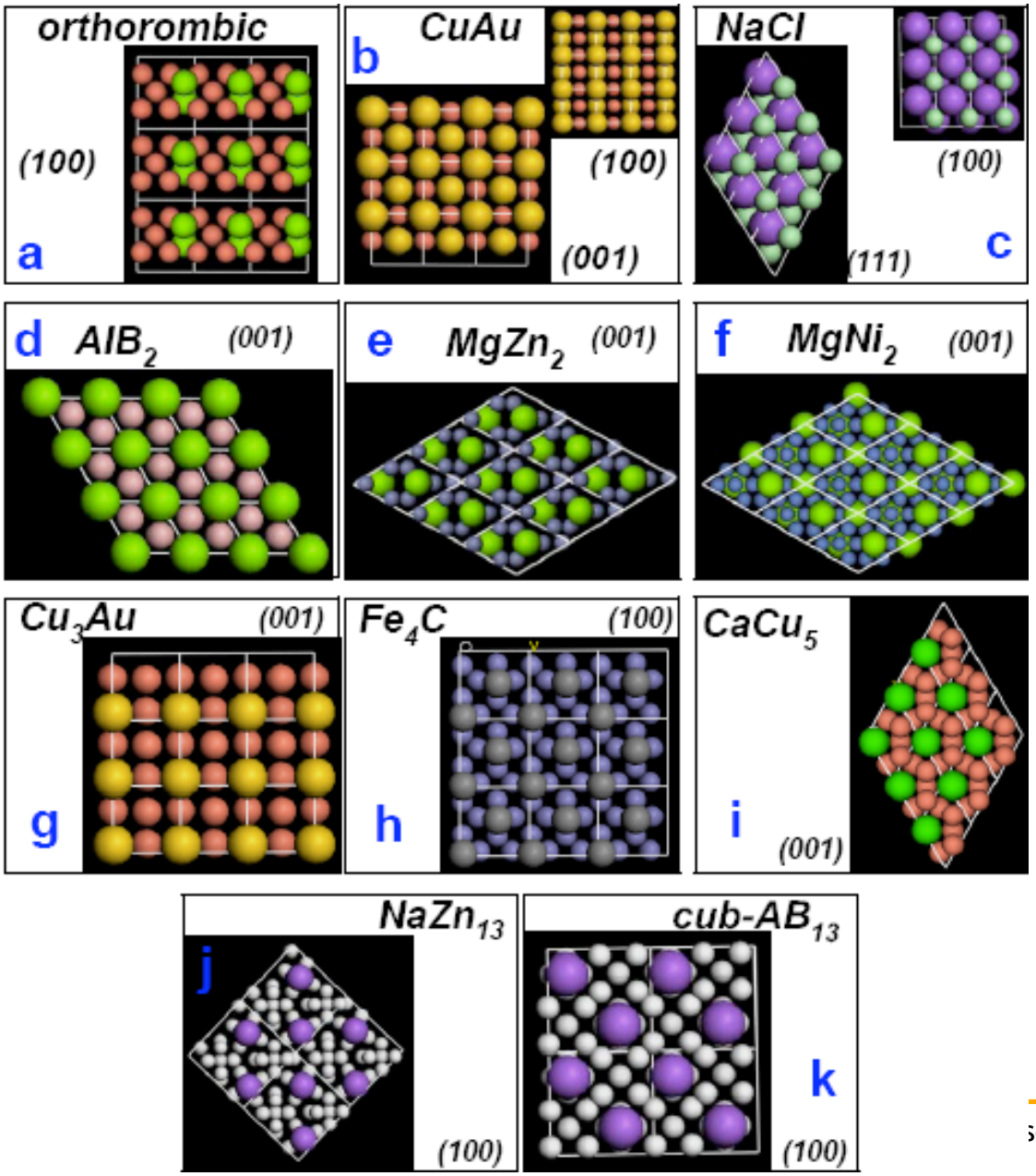


E. Shevchenko, D. Talapin, N Kotov, S. O'Brien, and C. B. Murray, *Nature* **439** (2006) 55-59.

(a) 6.2 nm PbSe and 3.0 nm Pd
(b) 7.6 nm PbSe and 5.0 nm
(c) 13.4 nm γ-Fe2O3 and 5.0 nm Pd
(d) 6.7 nm PbS and 3.0 nm Pd
(e) 6.2 nm PbSe and 3.0 nm Pd
(f) 5.8 nm PbSe and 3.0 nm Pd
(g) 7.2 nm PbSe and 4.2 nm Ag
(h) 6.2 nm PbSe and 3.0 nm Pd
(i) 7.2 nm PbSe and 5.0 nm Au
(j) 5.8 nm PbSe and 3.0 nm Pd
(k) 7.2 nm PbSe and 4.2 nm Ag
(l) 6.2 nm PbSe and 3.0 nm Pd.

Changing ratios and size.

Superlattices (Chris Murray):



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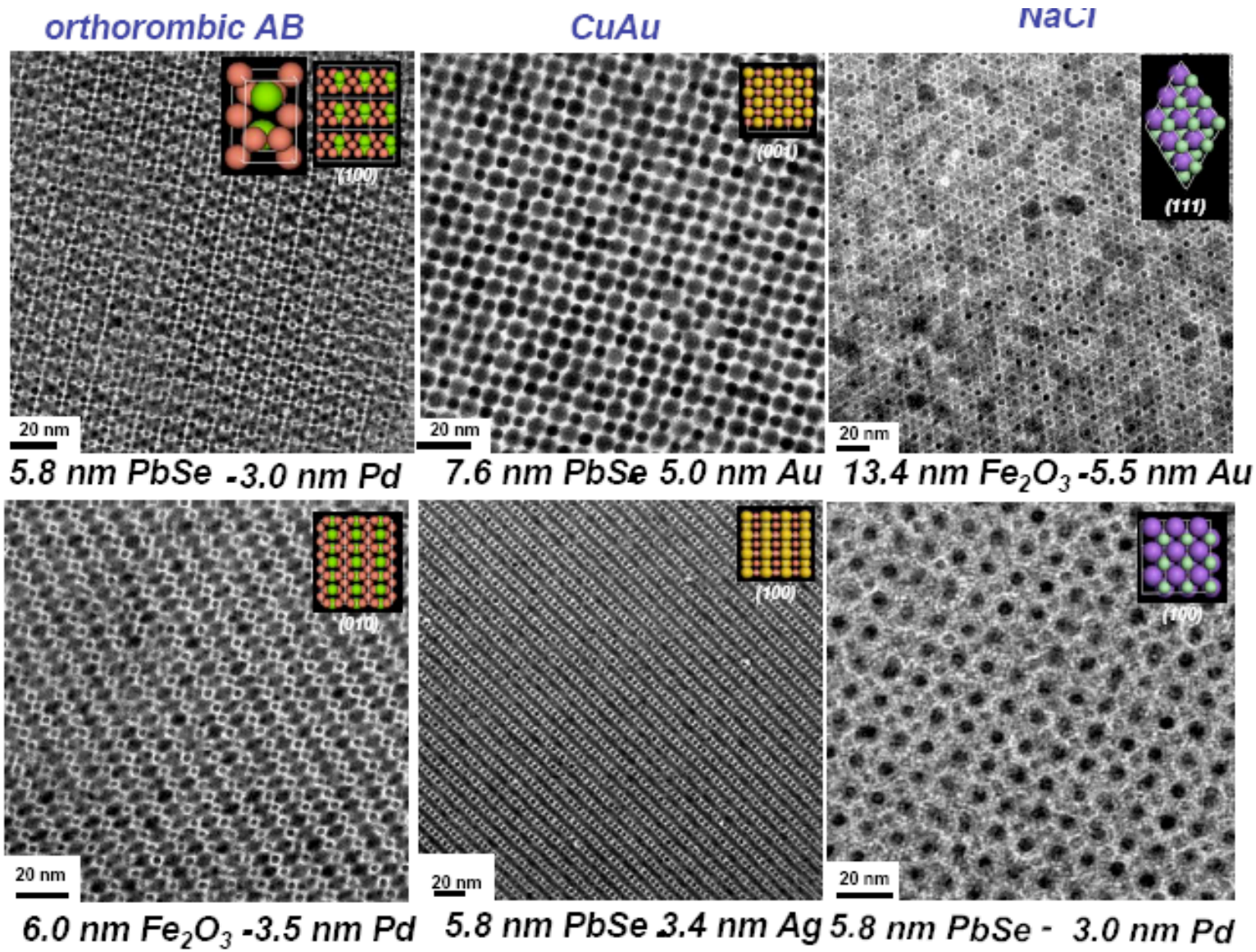
Superlattices (Chris Murray):



AB superlattices

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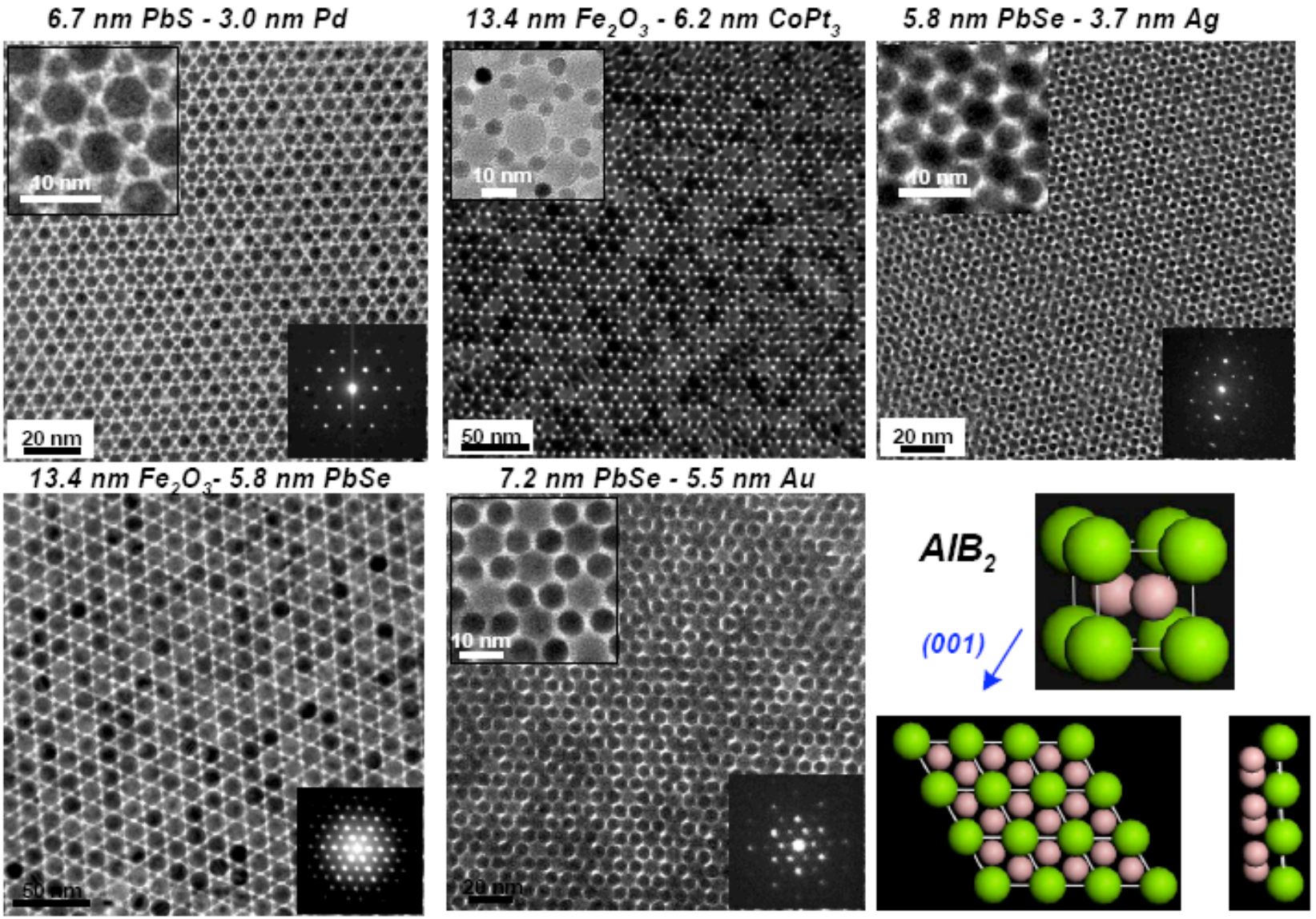
Superlattices (Chris Murray):



AB_2 superlattices

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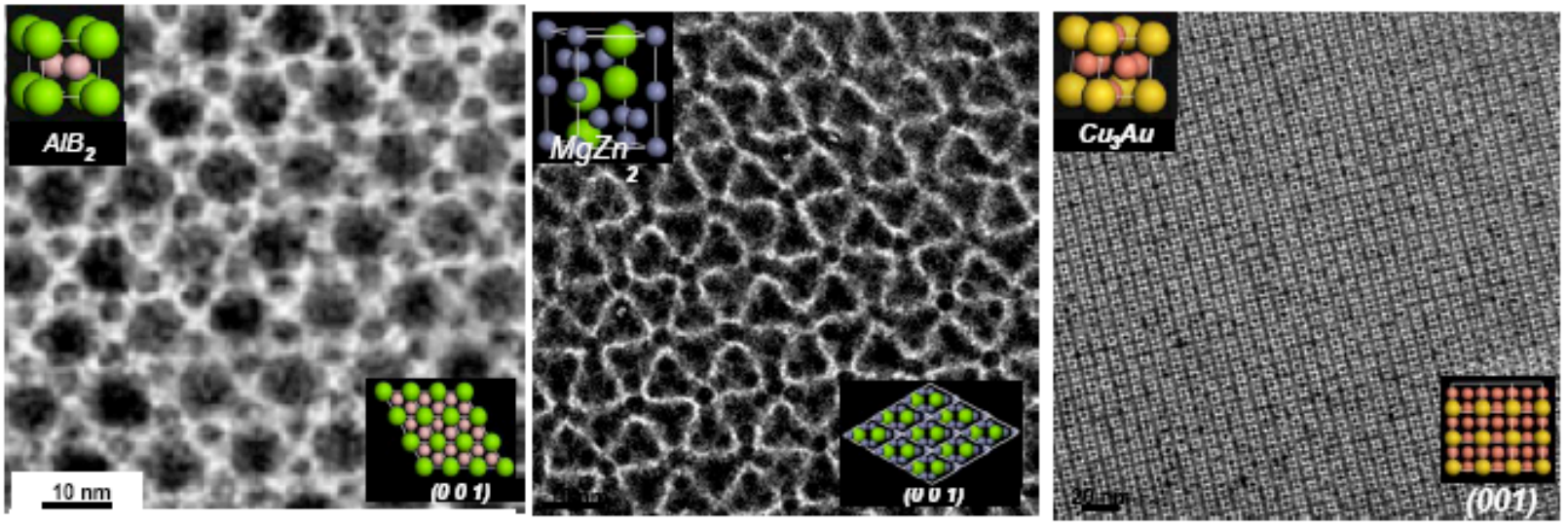
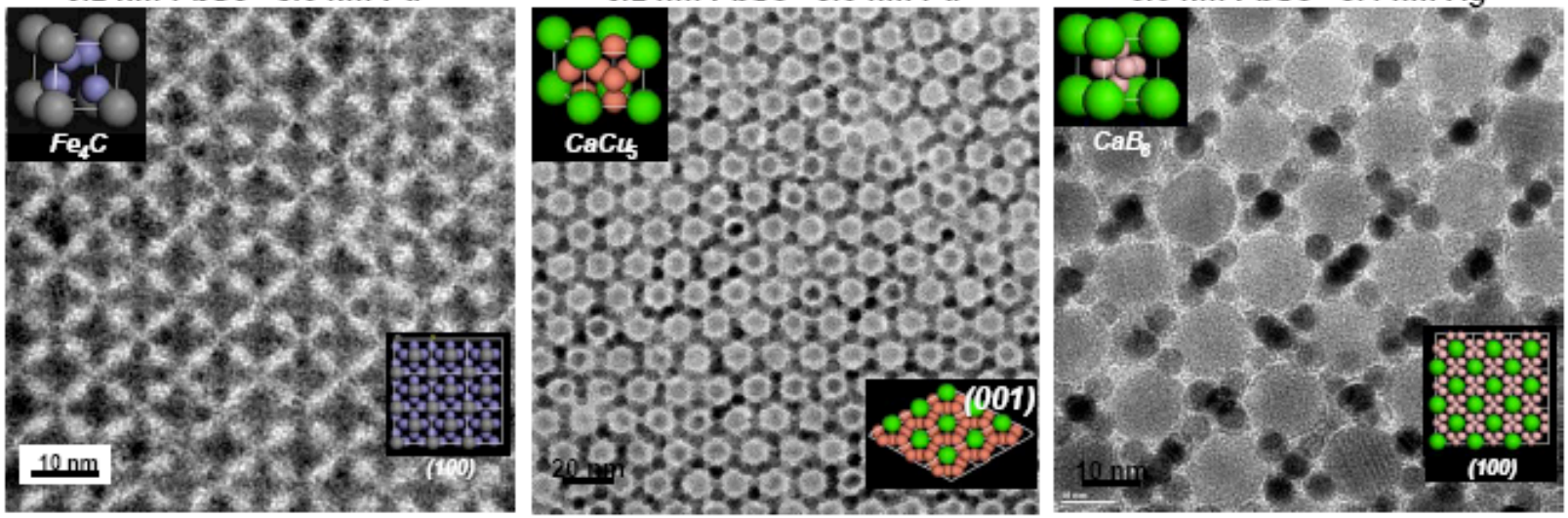
Superlattices (Chris Murray):



6.2 nm PbSe - 3.0 nm Pd | 6.2 nm PbSe - 3.0 nm Pd | 5.8 nm PbSe - 3.4 nm Ag



5.8 nm PbSe - 3.0 nm Pd | 6.2 nm PbSe - 5.0 nm Au | 13.4 nm Fe_2O_3 - 5.0 nm Au

AB_2 to AB_6 superlattices