

ハロゲン組成制御と量子サイズ効果を活用した高発光効率ペロブスカイト量子ドット

Perovskite Quantum Dots with High Photoluminescence Quantum Yield through Engineering of Halogen Composition and Quantum Size Effect

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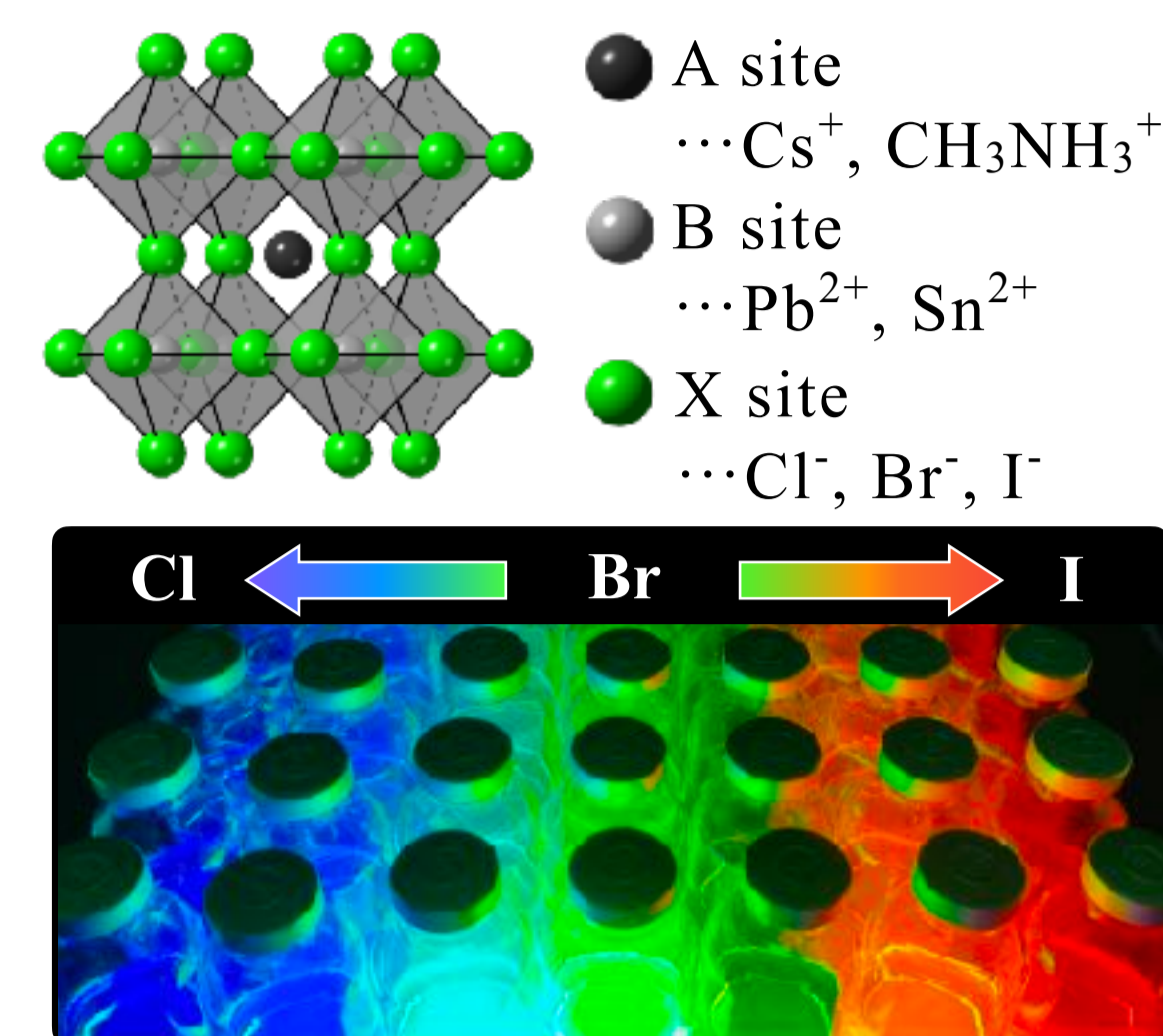
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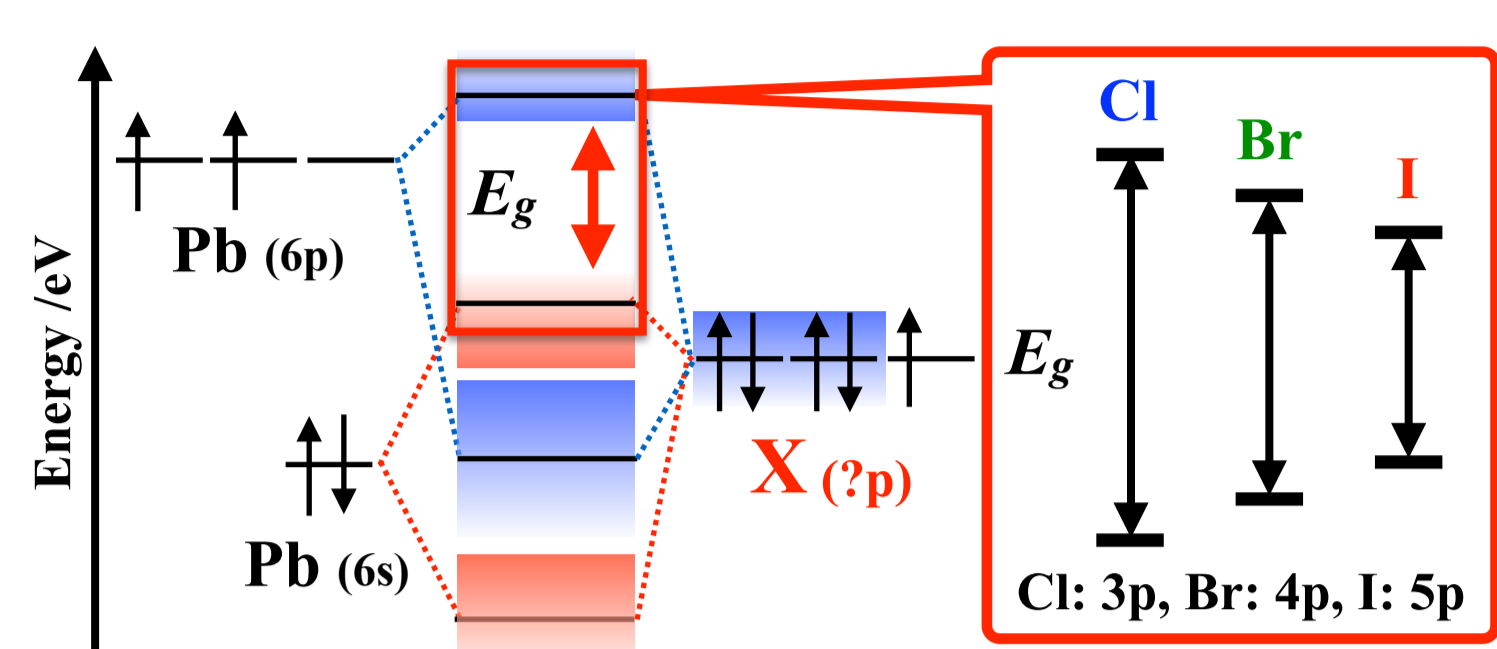
Background

ABX₃-type Perovskite Quantum Dots (PeQDs)

✓ Structure of PeQDs

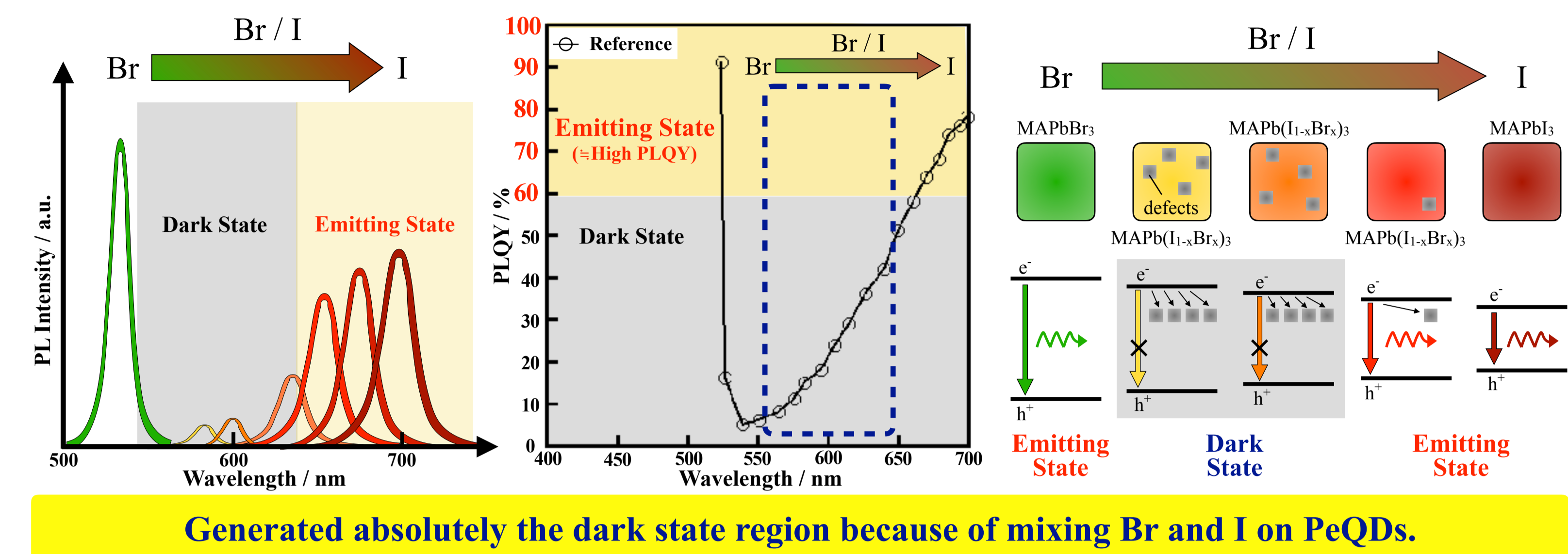


✓ Bandgap engineering with halogen composition



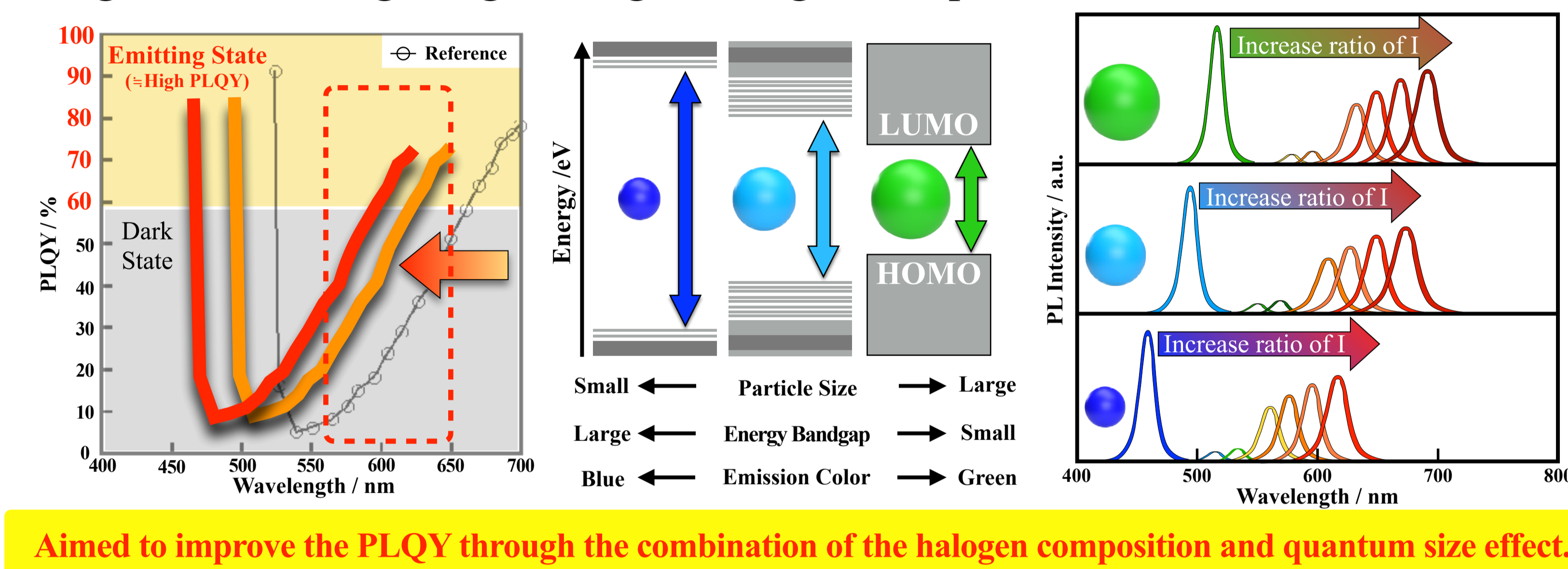
PeQDs are promising as light-emitting materials for various applications.

Br and I mixed PeQDs



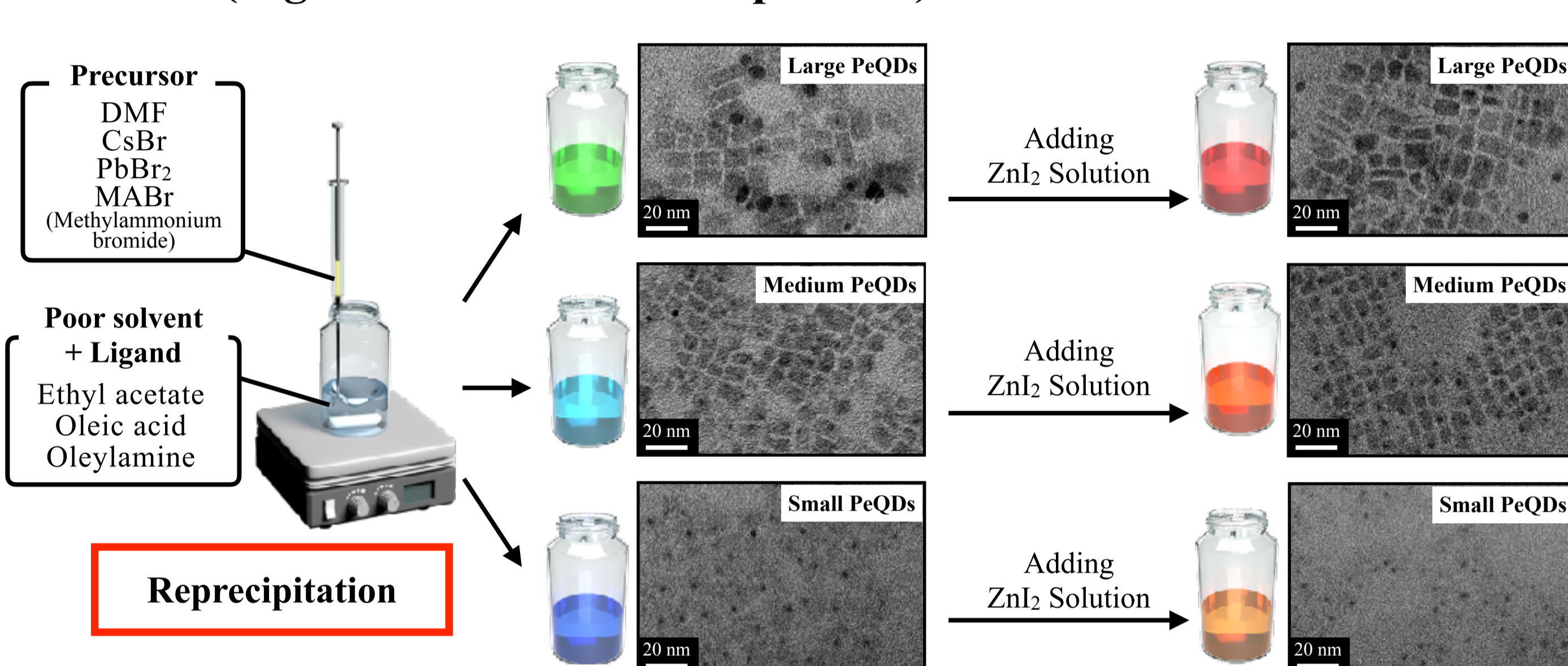
Purpose

High PLQY through Engineering of Halogen Composition and Quantum Size effect



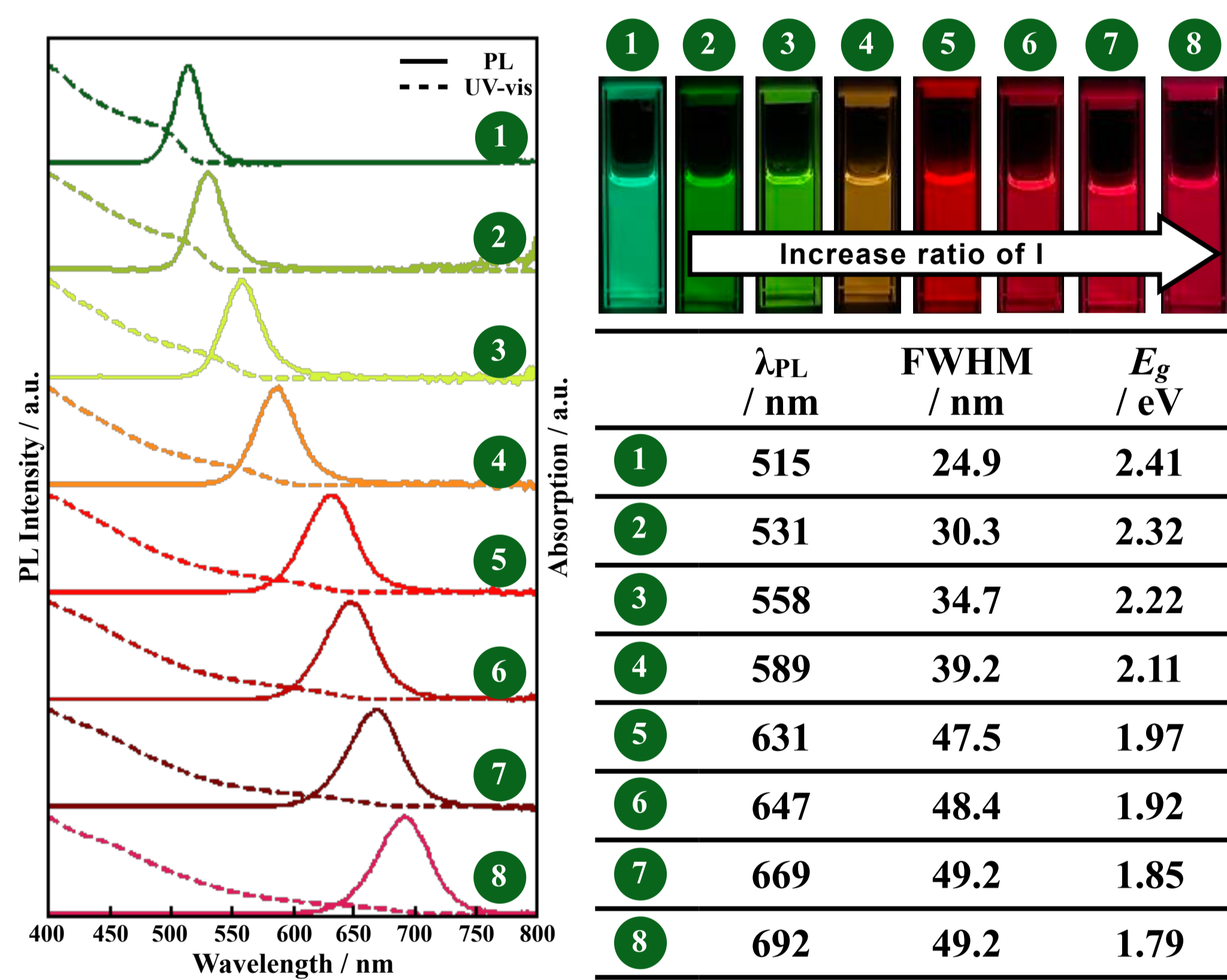
Experimental Section

LARP (Ligand-Assisted RePrecipitation)

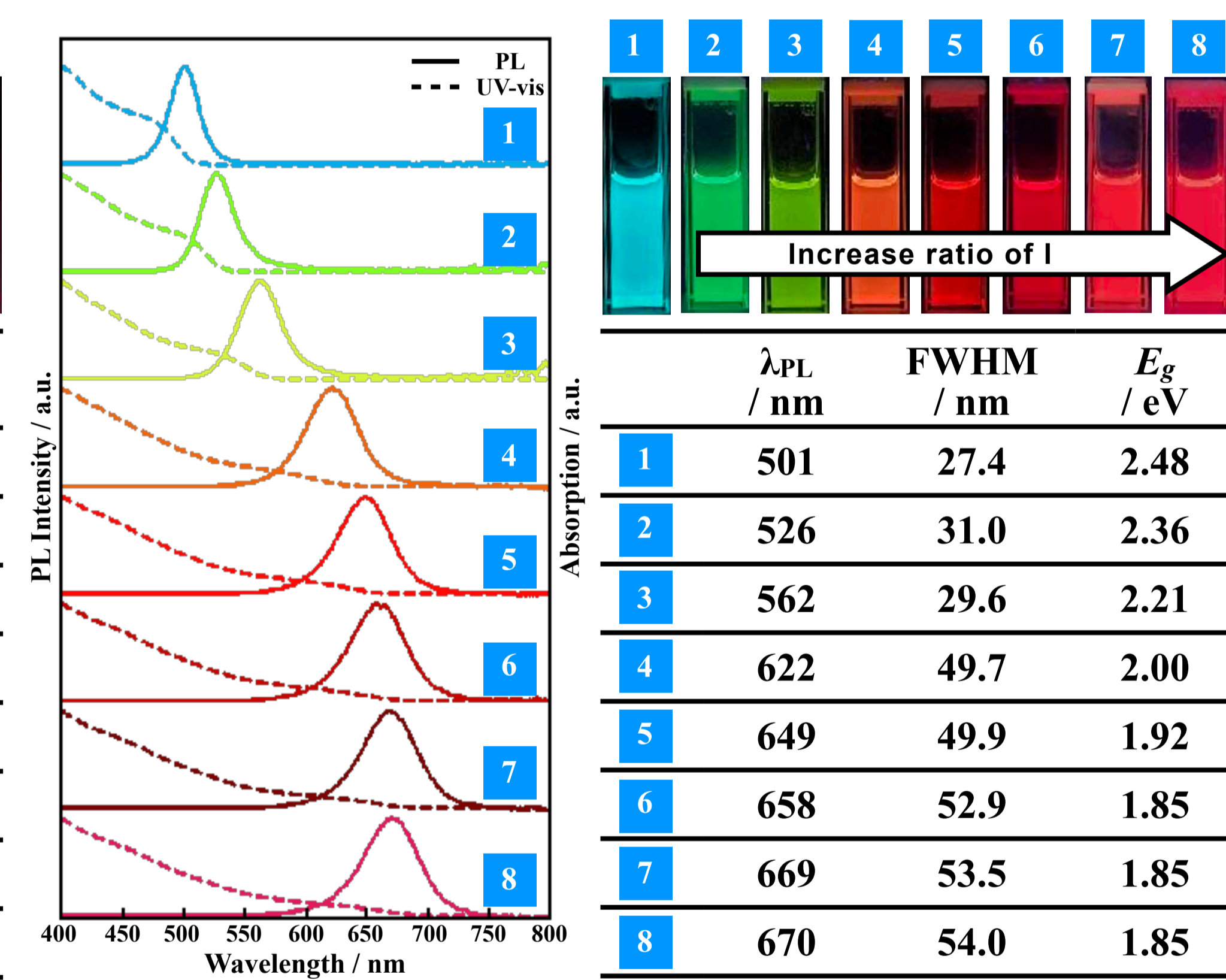


Results and Discussion

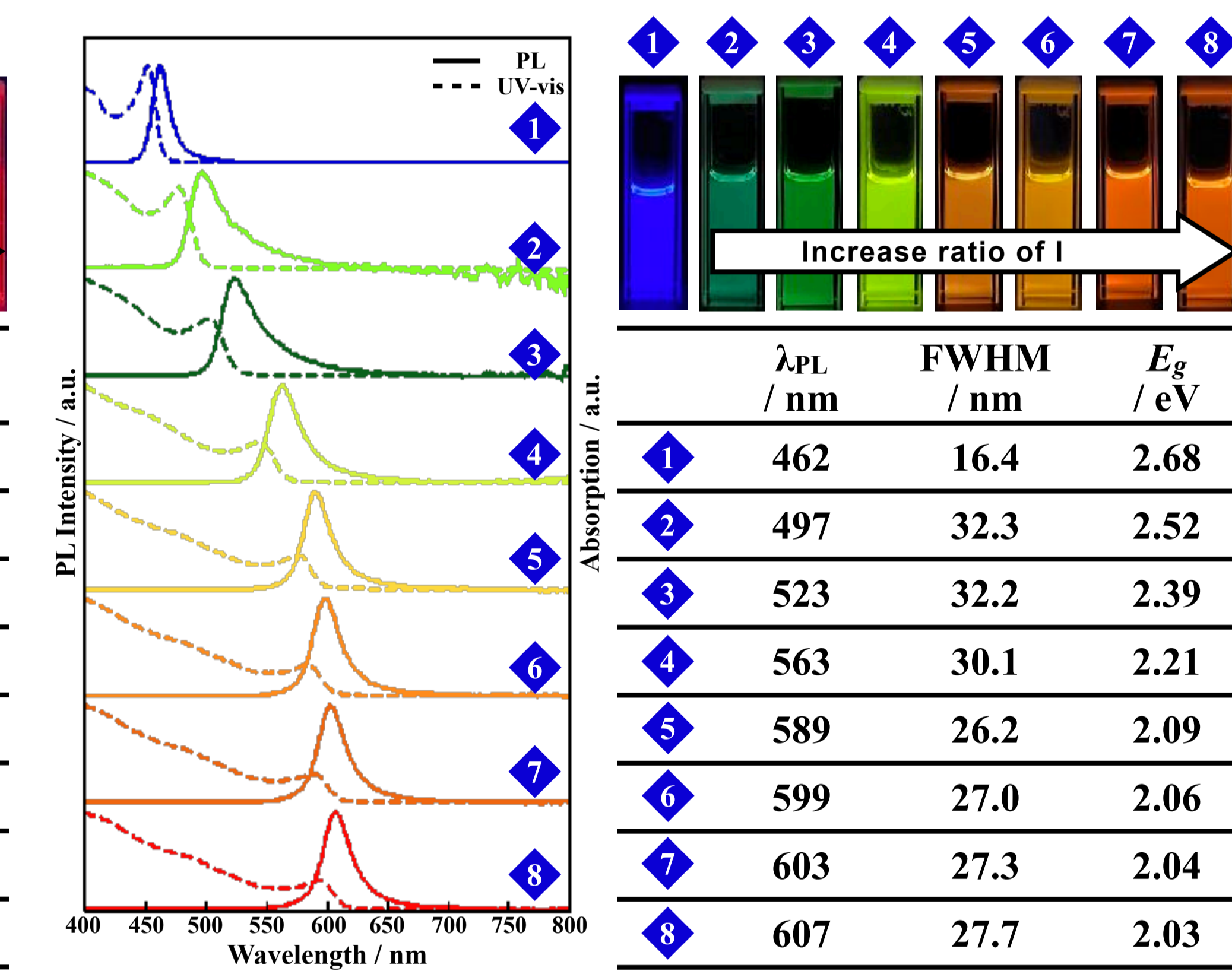
< Optical properties of Large PeQDs >



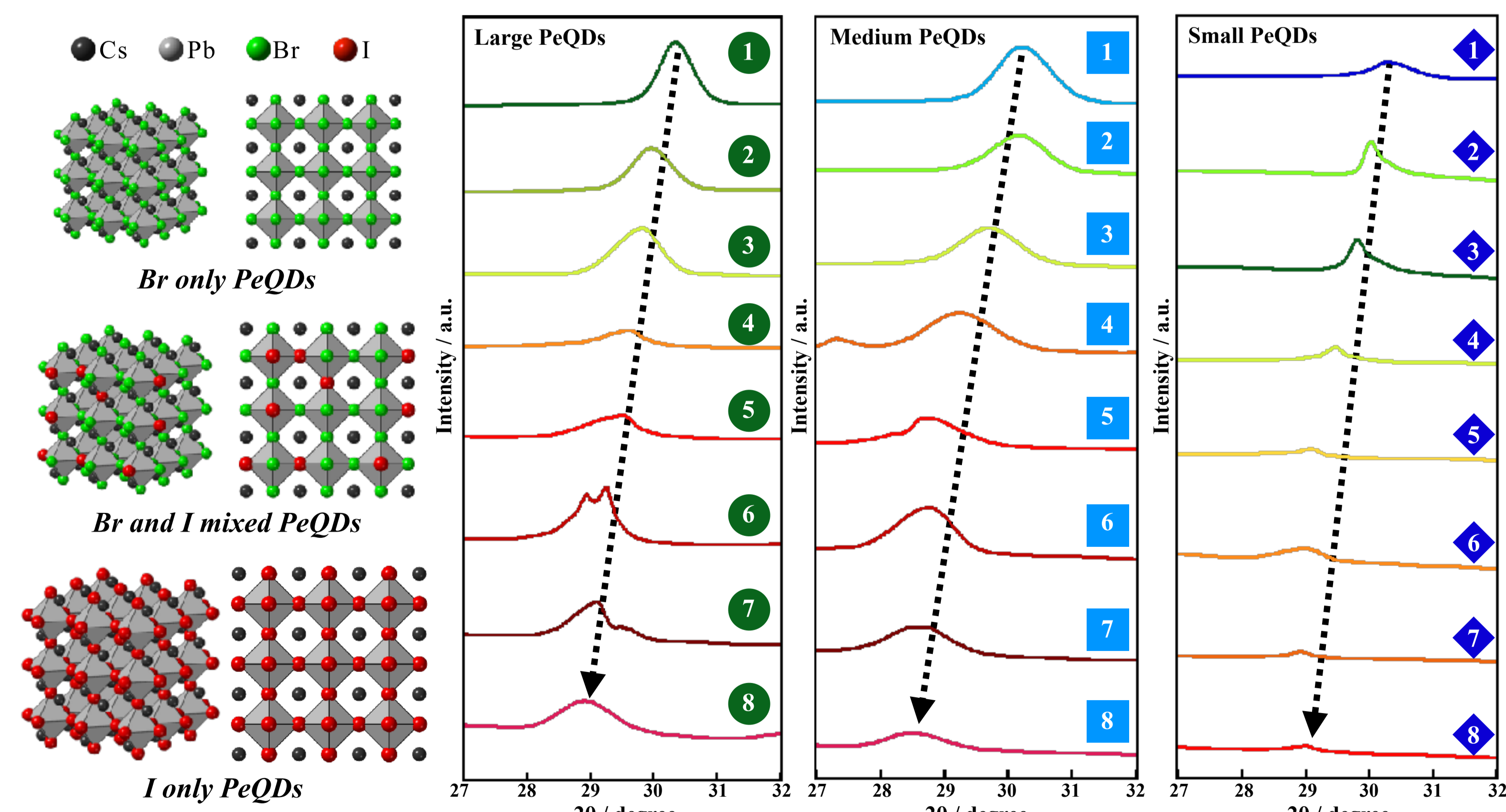
< Optical properties of Medium PeQDs >



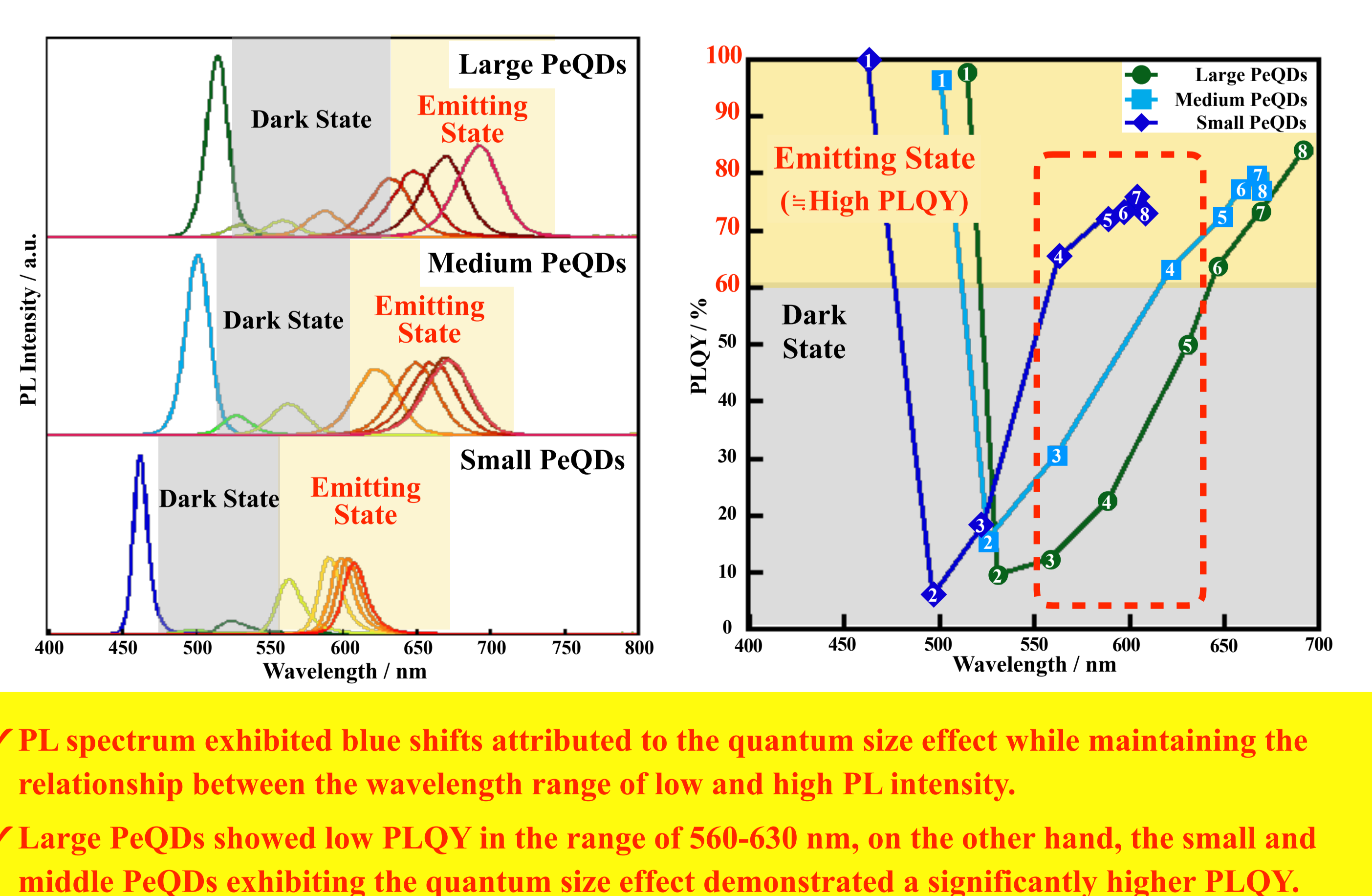
< Optical properties of Small PeQDs >



< X-ray diffraction pattern of PeQDs with different sizes >



< Comparing the optical properties of PeQDs with different sizes >



Conclusion

- ▶ Clarified that the PL spectrum exhibited blue shifts attributed to the quantum size effects while maintaining the relationship between the low and high PL intensity wavelength ranges.
- ▶ Successfully achieved the preparation of PeQDs with high PLQY (≧ 60%) by engineering both the halogen composition and quantum size effect.

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