Comment on "Size-Dependent Composition and Molar Extinction Coefficient of PbSe Semiconductor Nanocrystals"

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We are happy to read that Dai *et al.*[1] find that PbSe quantum dots (Qdots) are nonstoichiometric, thereby reproducing the results we published 2 years ago.[2] However, we cannot agree with their conclusion that "Moreels *et al.* (...) reported different molar extinction coefficients for PbSe semiconductor nanocrystals". Treating our data according to the procedure proposed by Dai *et al.* shows that both data sets agree (Figure 1). In addition, the key point of our work is that PbSe Qdots have the same absorbance as bulk PbSe at short wavelengths like 400 nm. Therefore, Qdot concentrations can be determined very accurately from a single point absorbance measurement, regardless of size dispersion, and the normalization procedure reintroduced by Dai *et al.* is unnecessary for PbSe Qdots. We also regret that Dai *et al.* stick to an integration or normalization on a wavelength scale. Integration of the first exciton transition on an energy scale yields an extinction coefficient directly proportional to the oscillator strength of the transition,[2] which is the more fundamental materials property. In conclusion, in contrast to the contribution of Dai *et al.*, we believe that the message to researchers using extinction coefficients to determine Qdot concentrations should be to use size-independent (bulk) values whenever applicable and, otherwise, energy integrated extinction coefficients.

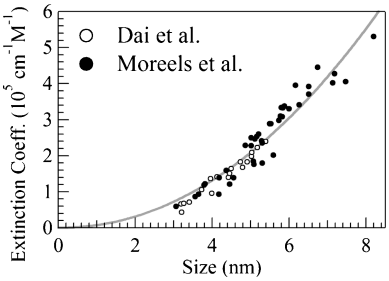

Figure 1. Q-PbSe molar extinction coefficient of Moreels *et al.*[2] (dots, Q-PbSe suspended in CCl_4) and Dai *et al.*[1] (open circles, Q-PbSe in C_2Cl_4), calculated according the procedure of Dai *et al.*[1] A power law with exponent 2.07 is fitted to the data sets. In the case of the data set of Moreels *et al.*, five points have been determined by means of elemental analysis while the others have been obtained by normalizing the Q-PbSe absorption spectrum to bulk PbSe at 400 nm.[2]

REFERENCES AND NOTES

1. Dai, Q.; Wang, Y.; Li, X.; Zhang, Y.; Pellegrino, D. J.; Zhao, M.; Zou, B.; Seo, J.; Wang, Y.; Yu, W. W. Size-Dependent Composition and Molar Extinction Coefficient of PbSe Semiconductor Nanocrystals. *ACS Nano* **2009**, *3*, 1518–1524.
2. Moreels, I.; Lambert, K.; De Muynck, D.; Vanhaecke, F.; Poelman, D.; Martins, J. C.; Allan, G.; Hens, Z. Composition and Size-Dependent Extinction Coefficient of Colloidal PbSe Quantum Dots. *Chem. Mater.* **2007**, *19*, 6101–6106.