Scheme 1 Experimental Setup for the synthesis of InP/ZnS QDs. PH₃ is prepared in vessel A and carried by Ar gas flow into vessel B. InP cores is synthesized based on reaction of PH₃ and InAc₃.

The measurement of quantum yields

We measured the quantum yields of QDs using a method described in the reference 42. Briefly, rhodamine 6G (ethanol as solvent) was chosen as a reference standard (QY = 95%), the absorbance of the standard and InP/ZnS colloid sample at the absorption peak and the fluorescence spectra of the same solutions were measured respectively. The integrated fluorescence intensity (that is, the area of the fluorescence spectrum) from the fully corrected fluorescence spectrum was calculated. The quantum yield was calculated according to the following equation:

$$\phi_x = \phi_s \left( \frac{M_x}{M_s} \right) \left( \frac{\eta_s}{\eta_x} \right)^2$$

Where the subscripts s and x denote standard (rhodamine 6G) and test samples respectively, $\phi$ is QY, M is the value of integrated fluorescence intensity/absorbance, and $\eta$ is the refractive index of the solvent. It should be noted that the excitation wavelength for measurements of QY was set at the excitonic absorption peak of the standard and InP/ZnS samples respectively.