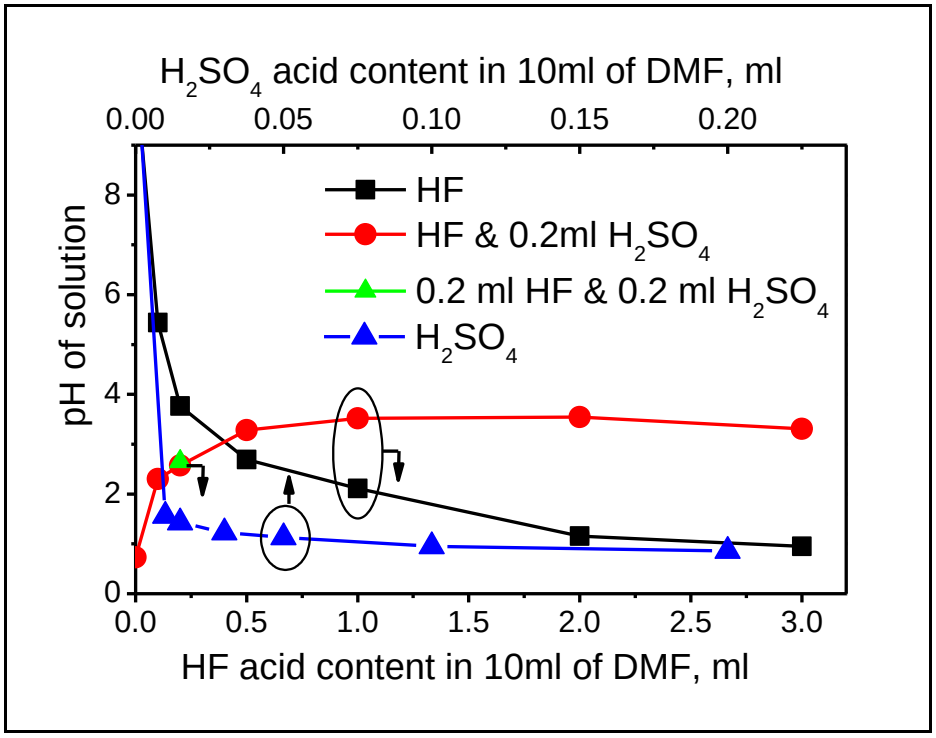
Supporting Information

Electrostatic Stabilized InP Colloidal Quantum Dots with High Photoluminescence Efficiency

Anush N. Mnoyan,† Artavazd Gh. Kirakosyan,† Hyunki Kim,† Ho Seong Jang,‡ and Duk Young Jeon*,†

†Department of Materials Science and Engineering, Korea Advanced Institute of Science and Technology (KAIST), Yuseong-gu, Daejeon 305-701, Korea
‡Korea Institute of Science and Technology, Seongbuk-gu, Seoul 136-791, Korea

Figure S1. pH dependence of solution from the acid content



The pH value corresponds to the ions concentration in acid/DMF solution according to the following acid dissociation schema [HAn] ⇔ [H^+] + [An^-] with given Keq. The pH of anhydrous DMF is measured to be over 10, indicating a low content of H^+ ions. However, the addition of 0.2 mL H_2SO_4 into 10mL of DMF reduces down the pH value of the solution to 0.85. A similar tendency is observed in the HF/DMF solution: the pH is changed from 10 to ~1 while the content

of HF in 10 ml of DMF is increased up to 3 ml. However, the addition of a second acid (HF) into the H_2SO_4/DMF does not lead to a cumulative phenomenon, particularly in the presence of 0.2 ml of H_2SO_4 in 10 ml of DMF: the pH value of the solution increases from 0.85 to 3.5 when 3ml of HF is added. For instance, the HF/H_2SO_4/DMF solution with a 0.2/0.2/10 ml ratio exhibits an increased pH value of 2.6 rather than a reduced value.

Table S1. Effect of pH on InP QD stability.

#	**1**	**2**	**3**
DMF, ml	10	10	10
HF, ml	0.2	-	-
H_2SO_4, ml	0.2	0.05	0.01
QD in octane, ml at 10mg/ml	6.0	6.0	6.0
pH	2.65	1.13	1.56

The series of photo images of samples show the degradation characteristics as a function of the acid solution content. As can be seen from the Figure S2, sample #3 with 0.01 ml of H_2SO_4 shows high acidity (pH = 1.56) and fast degradation within 60min. However, sample #1, which has higher HF (0.2 ml) and H_2SO_4 (0.2 ml) content, shows low acidity (pH = 2.65) and much slower degradation compared to samples #2, 3.

Figure S2. The photo images of samples showing the degradation as a function of the acid solution content

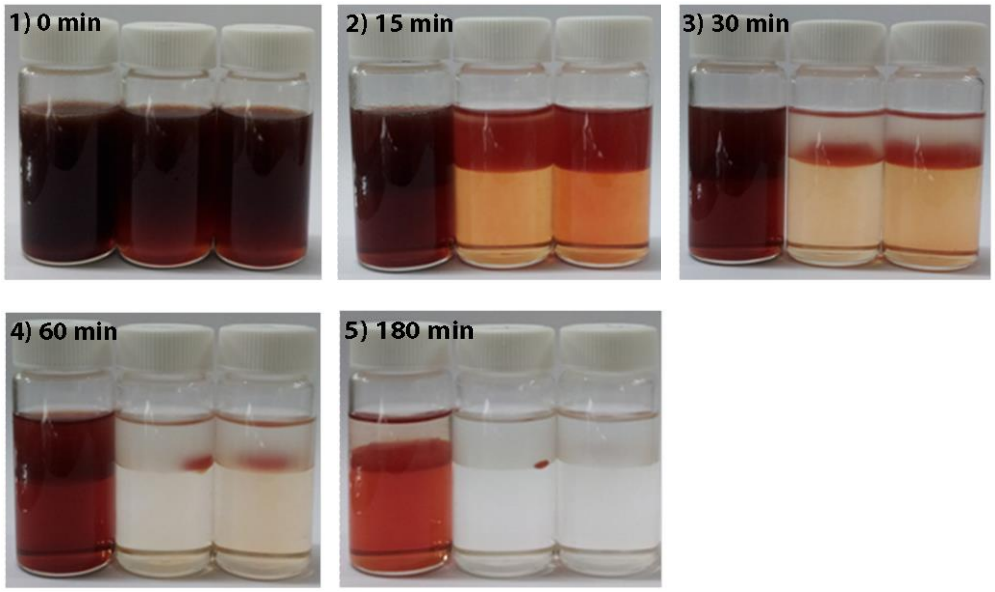


Table S2. Atomic contents of elements obtained from XPS expressed by %

Element	InP	InP-F	InP-FS
C1s	52.42	47.41	35.06
In3d5	2.92	5.70	13.54
N1s	2.91	2.55	8.78
O1s	37.26	34.30	22.17
P2p	4.49	6.17	7.66
F1s	-	3.87	4.20
S2p	-	-	8.59

Table S3. PL decay parameters of InP-Pr, HF-etched InP-HF, and our InP-FS QD solutions

Material	τ_1, **ns**	f_1	τ_2, **ns**	f_2	τ_3, **ns**	f_3	χ^2	τ_{avg}, **ns**

InP-Pr	3.6	23.11%	16.2	34.4%	84.3	42.5%	1.159	**42.2**
InP-HF etch.	8.9	26.7%	34.2	52.19%	149	21.14%	1.127	**51.7**
InP-FS	12.1	13.6%	44.2	54.7%	156	31.8%	1.029	**75.5**