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Supporting Information

Application of downshifting and antireflection stacked layers synthesized using a wet chemistry method with broad UV excitation for silicon heterojunction solar cells

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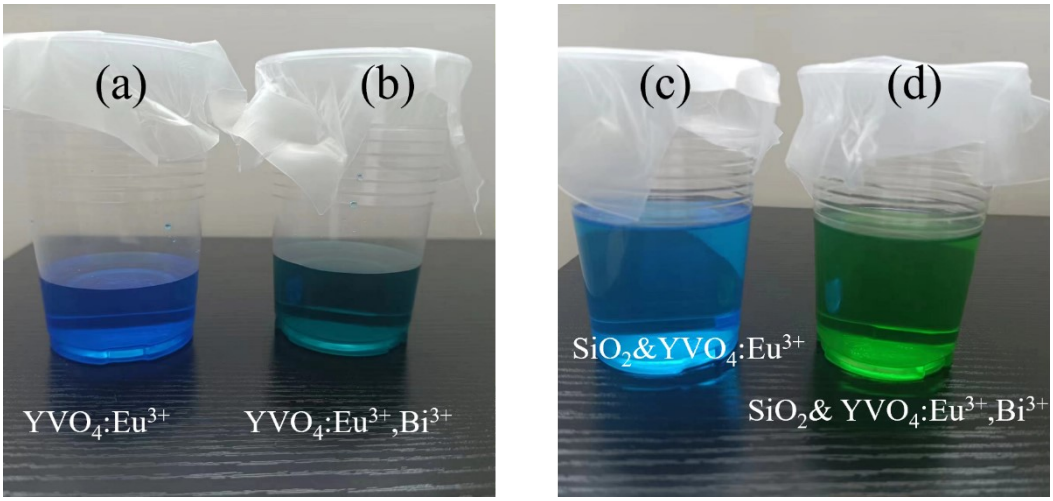

Figure S1. (a)$YVO_4:Eu^3$, (b) and $YVO_4:Eu^{3+}$, Bi^{3+}, (c) SiO_2 and $YVO_4:Eu^{3+}$, (d)SiO_2 and $YVO_4:Eu^{3+}$, Bi^{3+}.

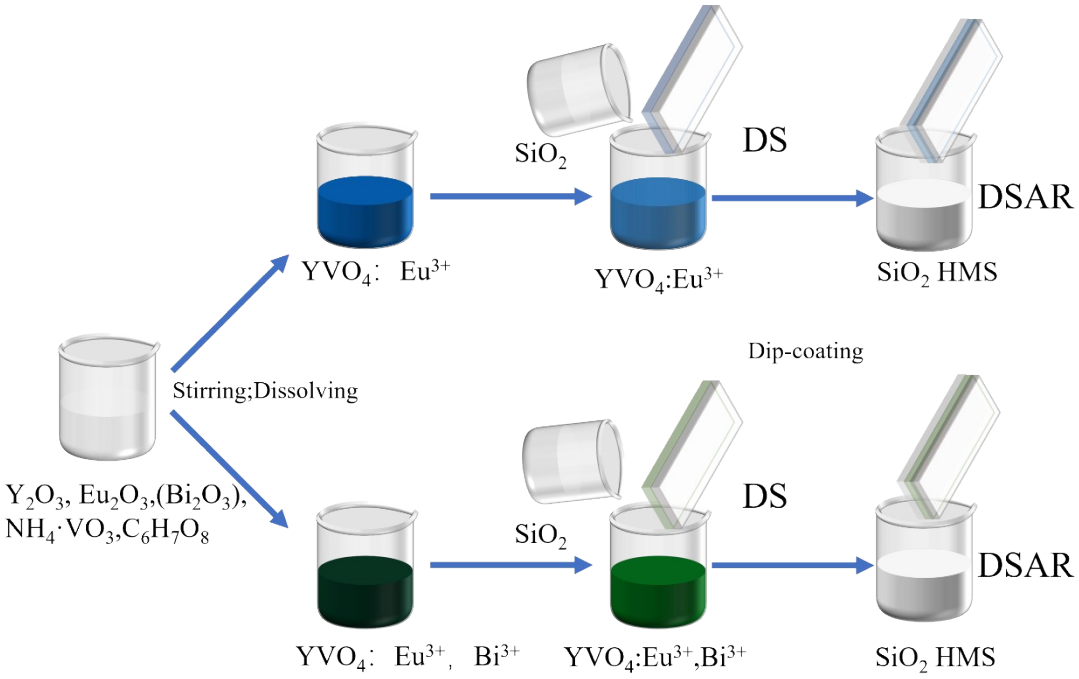

Figure S2. The process flow diagram of the DS and DSAR.

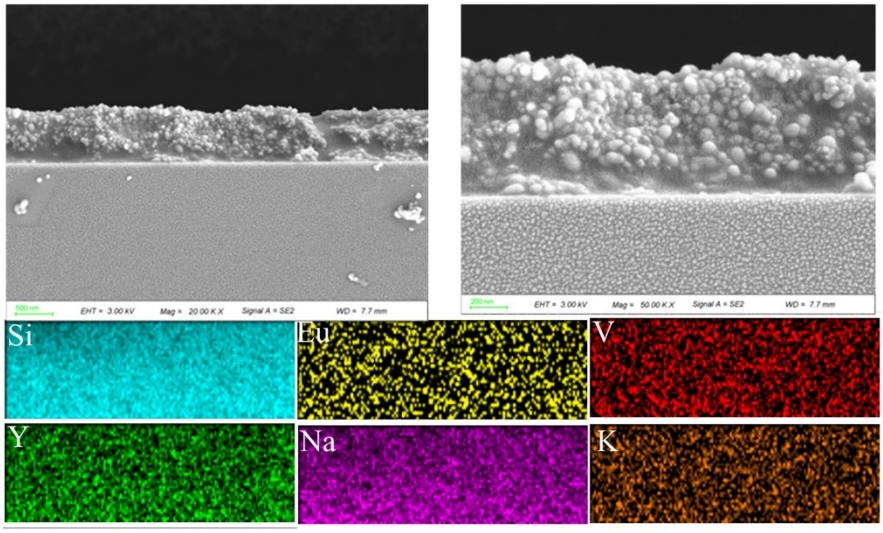

Figure S3. SEM cross-sectional image and EDS spectrum analysis of $YVO_4:Eu^{3+}$.

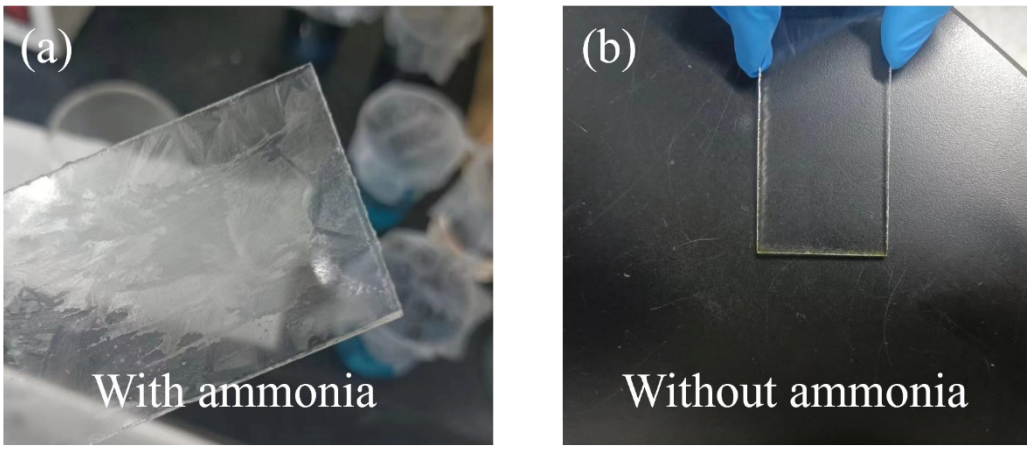

Figure S4. (a) Film surface with ammonia. (b) Film surface without ammonia.

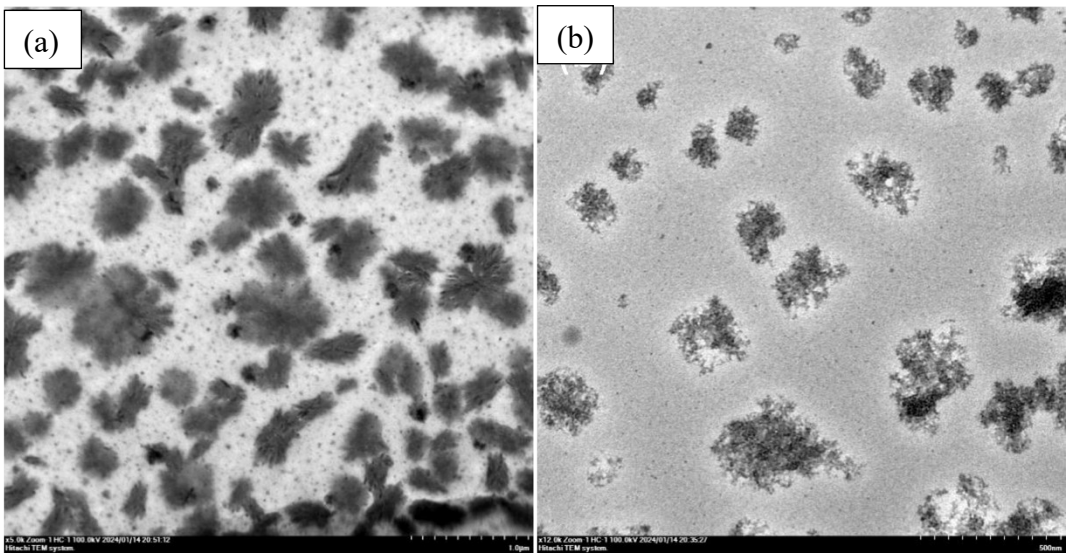

Figure S5: (a) TEM images of $YVO_4:Eu^{3+}$, Bi^{3+}. (b) SiO_2 and $YVO_4:Eu^{3+}$, Bi^{3+}.