materials

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Supplementary Materials

Quasi-Solid-State SiO_2 Electrolyte Prepared from Raw Fly Ash for Enhanced Solar Energy Conversion

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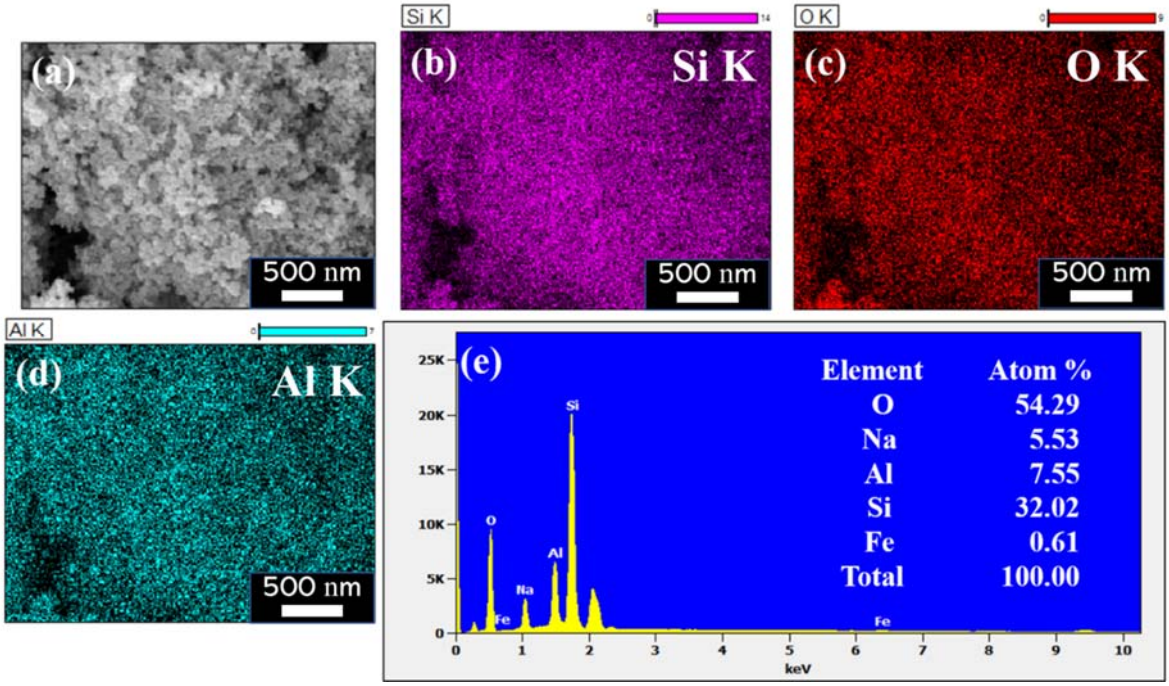

Figure S1. EDS analysis of the prepared FA_SiO_2.

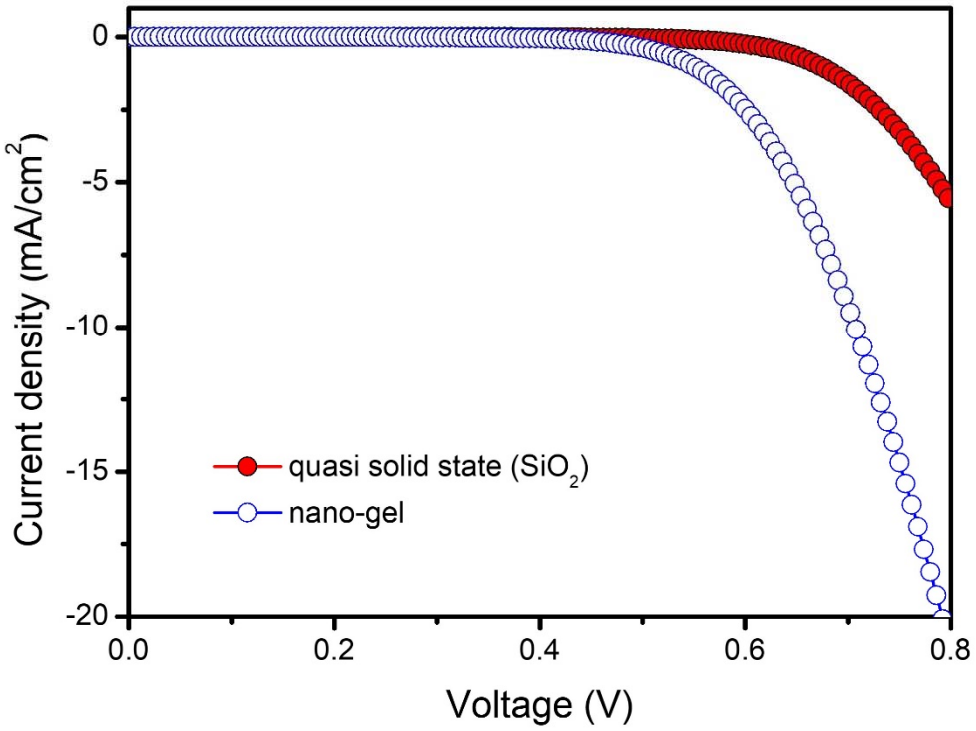

Figure S2. Photocurrent density-photovoltaic curves in the dark for DSSCs based on nano-gel and quasi solid state (SiO_2) electrolytes.

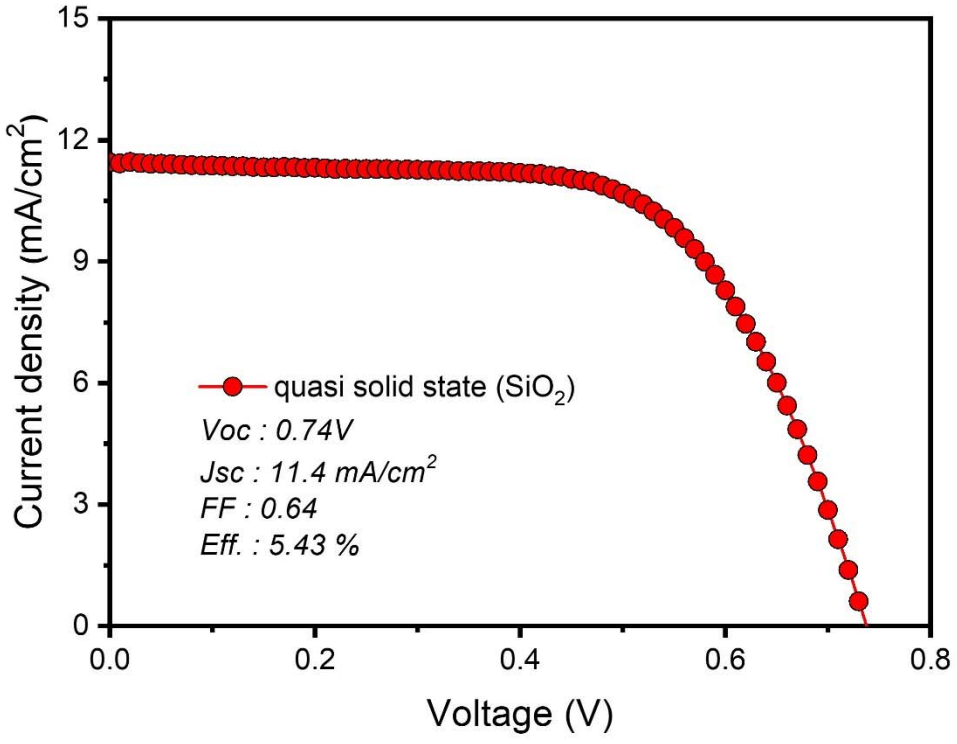

Figure S3. Photocurrent density-photovoltaic curves of DSSCs based quasi solid state (SiO_2) electrolytes at 100 mW cm^{-2} from different batches. Different cells were made for reliability test.

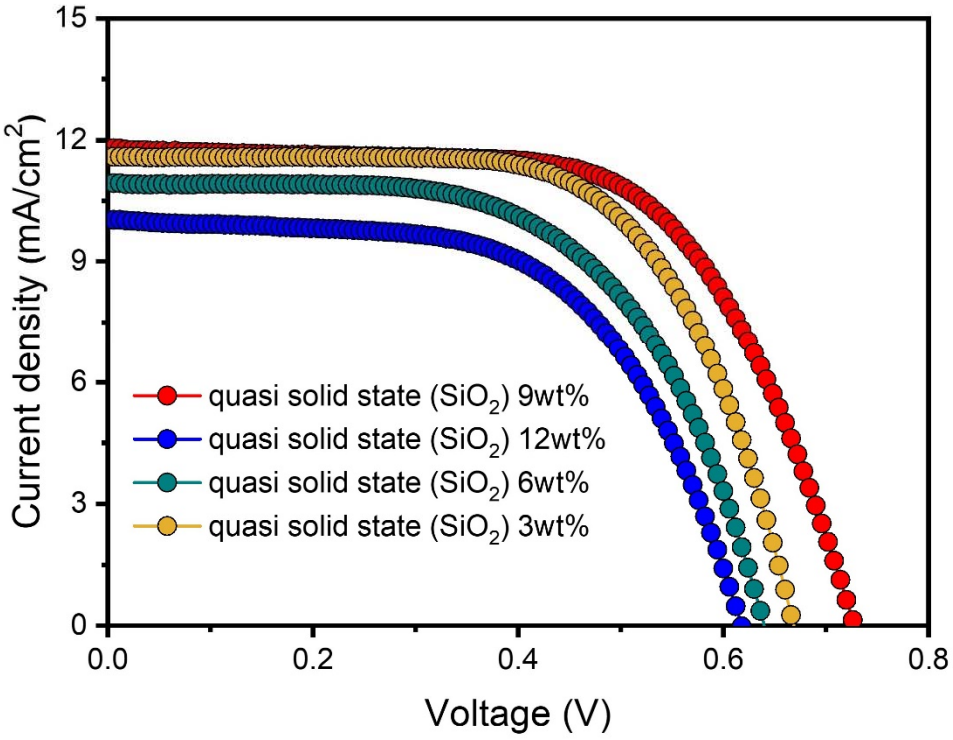

Figure S4. Photocurrent density-photovoltaic curves of DSSCs based on quasi solid state (SiO_2) electrolytes with different FA_SiO_2 content at 100 mW cm^{-2}.

Table S1. DSSCs electrolyte formulations.

Electrolyte	FA_SiO_2	PEG	LiI	MPII	I_2	Acetonitrile
Nano-gel	-	1 g	0.15 g	0.15 g	0.03 g	10 ml
Quasi solid state (SiO_2)	0.09 g	1 ml	0.15g	0.15 g	0.03 g	10 ml

Table S2. Comparison of photovoltaic parameters of DSSCs fabricated with quasi solid state electrolytes reported in the literature.

Quasi solid state electrolyte	*Voc* (V)	*Jsc* (mA/cm^2)	*FF*	η (%)	Reference
FA_SiO_2	0.73	12.1	0.62	5.5	This work
ZrO_2-C/PGEs	0.66	14.0	0.61	5.6	[41]
PHS	0.56	8.69	0.70	3.4	[42]
PGMA/PIN	0.84	20.37	0.47	8.0	[43]
P3/ES	0.51	4.8	0.62	1.5	[44]
P-WO_3	0.71	14.6	0.61	6.3	[45]

Table S3. Photovoltaic properties of DSSCs based on quasi solid state (SiO_2) electrolytes with different FA_SiO_2 contents under 1 sun illumination. (AM 1.5 G, 100 mW/cm^2).

	***Voc* (V)**	***Jsc* (mA/cm^2)**	***FF***	***η* (%)**
Quasi solid state (SiO_2) 3wt%	0.67	11.6	0.65	5.0
Quasi solid state (SiO_2) 6wt%	0.64	10.9	0.60	4.2
Quasi solid state (SiO_2) 9wt%	0.73	12.1	0.62	5.5
Quasi solid state (SiO_2) 12wt%	0.62	10.0	0.60	3.7