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Long-term reliability on silicon wafer-based traditional backsheet modules and double glass photovoltaic modules

Yingbin Zhang^{a,b}, Jianmei Xu^b, Jing Mao^b, Jiahua Tao^a, Hui Shen^b, Yifeng Chen^b, Zhiqiang Feng^b, Pierre J. Verlinden^b, Pingxiong Yang^{*a} and Junhao Chu^a

^aKey Laboratory of Polar Materials and Devices, Ministry of Education, Department of Electronic Engineering, East China Normal University, 500 Dongchuan Road, Shanghai 200241, China.

^bState Key Laboratory of PV Science and Technology, Changzhou Trina Solar Energy Co., Ltd. 2 Tianhe Road, Electronics Park, New District, Changzhou, Jiangsu 213031, China.

^aCorresponding author. Tel: +86 21 54345157; fax: +86 21 54345119. E-mail: pxyang@ee.ecnu.edu.cn (P. Yang)

Tables

Table S1 Electrical performance before and after TC stress for two different modules.

Sample	TC times	Average P _{max} (W)	Average V _{oc} (V)	Average I _{sc} (A)	Average FF(%)
Double glass Modules	Initial	257.1	37.71	8.957	76.1
Traditional Modules		257.1	37.69	9.017	75.6
Double glass Modules	TC200	251.7	37.47	8.869	75.8
Traditional Modules		248.3	37.34	8.808	75.5
Double glass Modules	TC400	249.4	37.43	8.866	75.5
Traditional Modules		247.1	37.39	8.763	75.5
Double glass Modules	TC600	249.9	37.41	8.867	75.4
Traditional Modules		247.2	37.43	8.786	75.2

Table S2 Electrical performance before and after DH for two different modules.

Sample	DH times	Average P_{\max} (W)	Average V_{oc} (V)	Average I_{sc} (A)	Average FF(%)
Double glass Modules	Initial	256.8	37.54	9.035	75.7
Traditional Modules		257.5	37.57	8.911	76.6
Double glass Modules	DH1000	250.6	37.54	8.861	75.3
Traditional Modules		247.6	37.53	8.588	76.2
Double glass Modules	DH2000	249.3	37.54	8.825	75.2
Traditional Modules		243.7	37.49	8.542	76.1
Double glass Modules	DH3000	248.8	37.49	8.786	75.5
Traditional Modules		238.6	37.49	8.506	74.8

Table S3 Electrical performance change % after HF for two different modules.

Sample	HF times	Average P_{\max} (W)	Average V_{oc} (V)	Average I_{sc} (A)	Average FF(%)
Double glass Modules	Initial	250.4	37.37	8.92	75.1
Traditional Modules		250.8	37.45	8.95	74.8
Double glass Modules	HF10	249.0	37.33	8.88	75.1
Traditional Modules		245.3	37.3	8.83	74.5
Double glass Modules	HF20	247.3	37.29	8.85	75.0
Traditional Modules		239.2	37.33	8.78	73.0
Double glass Modules	HF30	246.0	37.22	8.80	75.1
Traditional Modules		232.2	37.16	8.71	71.7
Double glass Modules	HF40	245.7	37.23	8.78	74.9
Traditional Modules		203.0	36.79	8.70	63.4
Double glass Modules	HF50	243.6	37.20	8.76	74.7
Traditional Modules		166.2	35.96	8.71	53.0

Table S4 Electrical performance after PID stress for two different modules

Sample	PID hours	Average P_{\max} (W)	Average V_{oc} (V)	Average I_{sc} (A)	Average FF(%)
Double glass Modules	Initial	263.8	38.0	9.13	76.0
Traditional Modules		261.7	38.0	8.96	77.0
Double glass Modules	192hrs	261.5	38.0	9.09	75.7
Traditional Modules		249.0	37.9	8.90	73.8
Double glass Modules	288hrs	261.7	38.0	9.06	75.9
Traditional Modules		235.7	37.7	8.88	70.4
Double glass Modules	384hrs	260.2	38.0	9.07	75.6
Traditional Modules		230.3	37.7	8.89	68.8
Double glass Modules	480hrs	258.4	37.9	9.00	75.7
Traditional Modules		232.3	37.7	8.88	69.4
Double glass Modules	600hrs	257.8	38.0	8.97	75.7
Traditional Modules		226.9	37.7	8.87	67.9

Table S5 Electrical performance after multiple sequential stress test for two different modules.

Sample	Multiple sequential stress	Average P_{\max} (W)	Average V_{oc} (V)	Average I_{sc} (A)	Average FF(%)
Double glass Modules	Initial	256.9	37.56	9.048	75.6
Traditional Modules		257.4	37.63	8.938	76.5
Double glass Modules	DH2000	250.6	37.55	8.803	75.4
Traditional Modules		247.8	37.52	8.702	75.9
Double glass Modules	DH2000+TC600	247.1	37.59	8.797	74.7
Traditional Modules		242.1	37.53	8.658	74.5
Double glass Modules	DH2000+	244.2	37.42	8.805	74.1
Traditional Modules	TC600+HF50	57.5	33.25	8.561	20.2