課題番号　　:F-21-TT-0007
利用形態　　:機器利用
利用課題名（日本語）　　:次世代太陽電池技術の開発のためのナノ材料とこれを利用した太陽電池の製作と分析
Program Title (English)　　:Development of nanomaterials for the next generation solar cells
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キーワード／Keyword　　リソグラフィ・露光・描画装置

1. 概要（Summary）

Silicon heterojunction solar cells are next generation commercial solar cells and the development of technologies enabling the fabrication of high-efficiency and low-cost silicon heterojunction solar cells, is quite important [1]. For this purpose, the electrode design and fabrication technologies of silicon heterojunction solar cells are studied by using equipment at nanotechnology platform, Toyota Technological Institute.

2. 実験（Experimental）

【利用した主な装置】

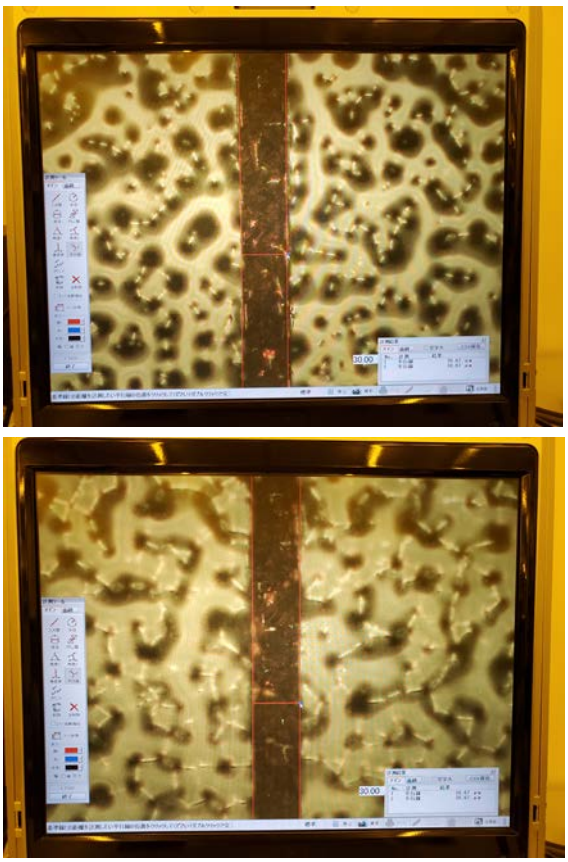
マスクレス露光装置、マスクアライナ装置、洗浄ドラフト一式、デジタルマイクロスコープ群

【実験方法】

To study electrode design and fabrication, a photoresist was spin-coated at 1500rpm, 2000 rpm, and 3000 rpm to obtain homogeneous photoresist coating on the pyramid textured surface of Si solar cells. After the photoresist coating, the samples were aligned and exposed to various light conditions (an expose dose of 384 ~ 600 mJ/cm^2) and developed.

3. 結果と考察（Results and Discussion）

After the photolithography process, the formation of desired 30 micrometer-wide electrode patterns on the surface of pyramid textured solar cells is confirmed by an optical microscope as shown in Fig 1(b). Thicker photoresist (~5.8 micrometer-thick, spin-coated at 1500 rpm) can remove shunt problems during the formation of silver electrodes on the surface of pyramid textured solar cells.



(a)

(b)

Fig. 1 The optical images of a patterned photoresist coated on the pyramid textured surface of solar cells. The photoresist was spin-coated at (a) 3000 rpm and (b) 1500 rpm, respectively. The pyramid textured surface of solar cells is well covered by the photoresist coated at 1500 rpm, which can avoid shunt problem.

4. その他・特記事項（Others）

・参考文献：[1] J. Haschke et al., Sol, Energy Mater. Sol. Cells. **187**, (2018) 140.

5. 論文・学会発表（Publication/Presentation）　なし。

6. 関連特許（Patent）　なし。