

1 **High carrier-mobility crystalline silicon film directly grown on polyimide by**  
2 **SiCl<sub>4</sub>/H<sub>2</sub> microwave plasma for flexible thin film transistors**

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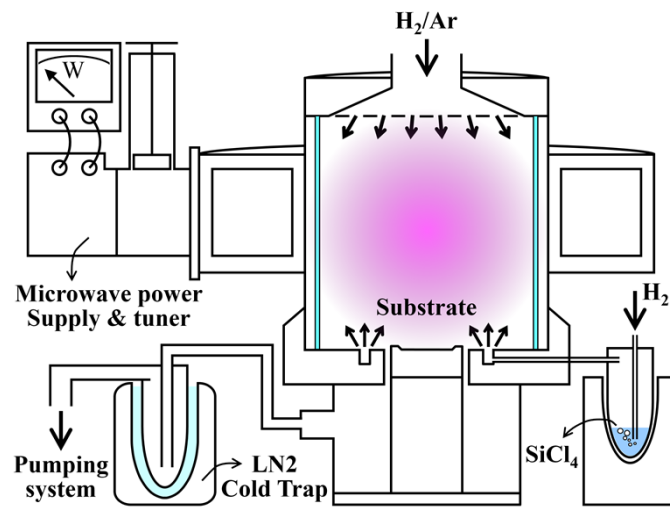
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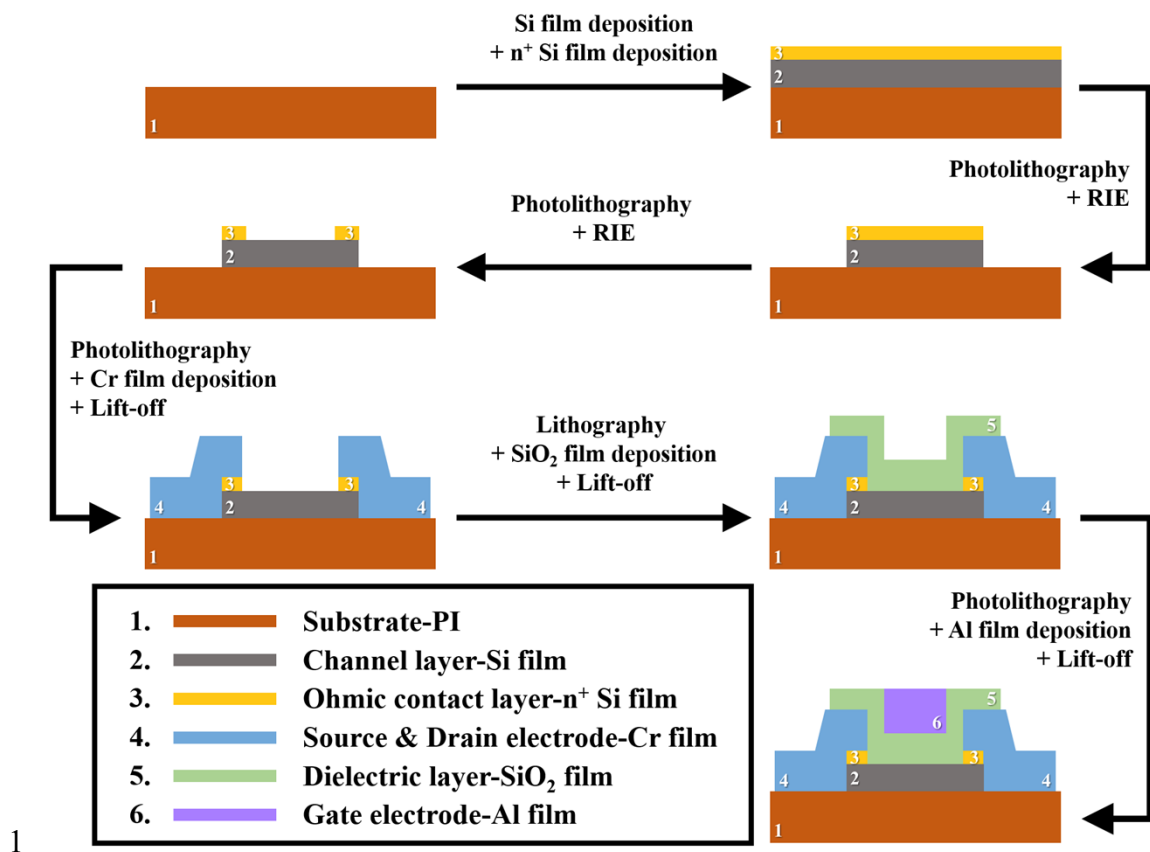
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## 1 Supporting information

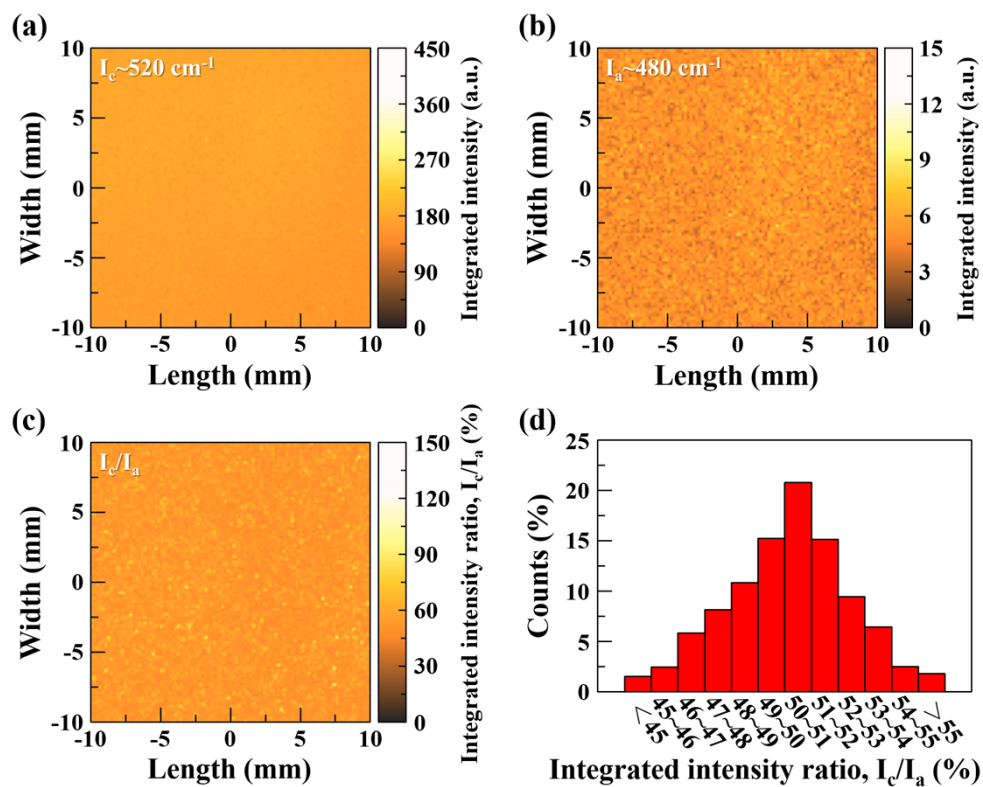


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3 Fig. S1 Schematics of the MEPECVD system for the deposition of crystalline Si film.



2 Fig. S2 Flowchart of the preparation processes for flexible Si-TFTs.



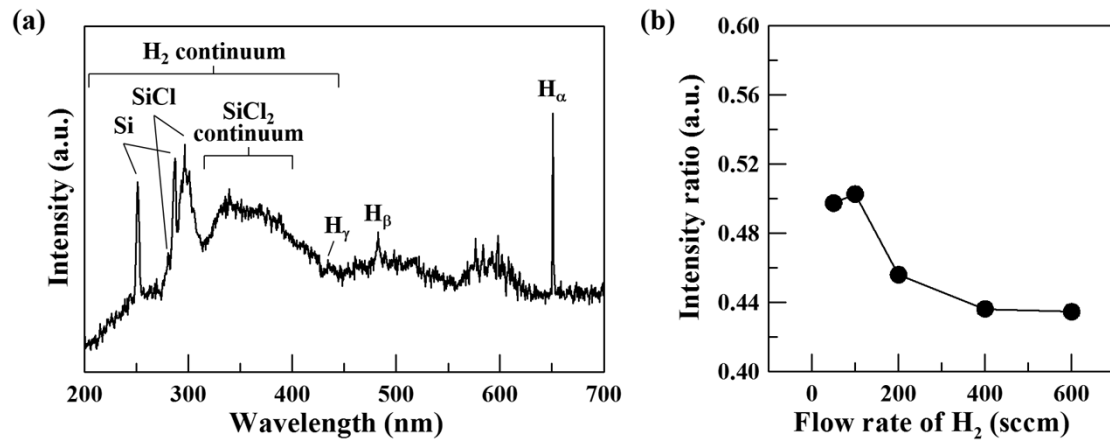
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2 Fig. S3 Raman mapping of the prepared Si film under H<sub>2</sub> flow rate 100 sccm, (a)

3 integrated intensity map of crystalline phase near 520 cm<sup>-1</sup>, (b) integrated intensity map

4 of the amorphous phase at 480 cm<sup>-1</sup>, (c) integrated intensity ratio map of (a) and (b) ,

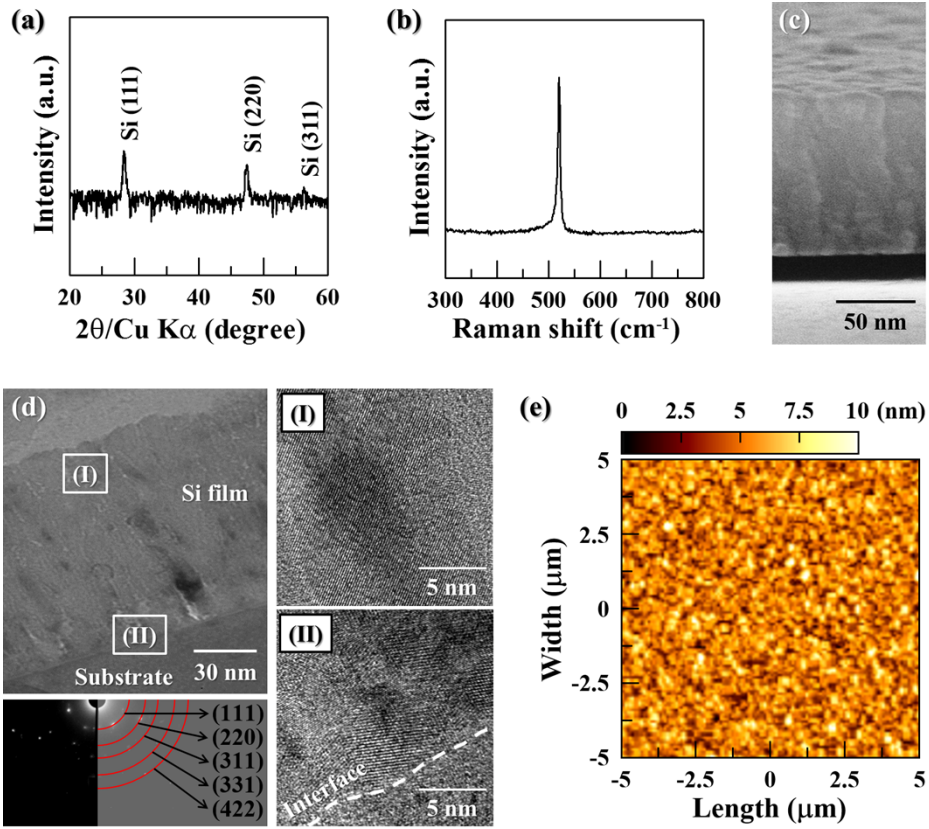
5 respectively; (d) Statistics of integrated intensity ratio from (c).



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2 Fig. S4 (a) Typical OES spectrum from a glow discharge of a H<sub>2</sub>-diluted SiCl<sub>4</sub> mixture

3 in a MWPECVD system. (b) The OES intensity ratio of H<sub>β</sub>/H<sub>α</sub> versus H<sub>2</sub> flow rate.



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2 Fig. S5 (a) XRD pattern, (b) Raman spectrum, (c) FESEM cross-sectional morphology,  
 3 (d) cross-sectional BFI image with SAED pattern and corresponding HRTEM images  
 4 where images (I) and (II) represent the topmost and the bottom layers, respectively, and  
 5 (e) AFM surface topography of the Si channel layer prepared using optimal H<sub>2</sub> flow  
 6 rate of 100 sccm to fabricate the film with a thickness of 100 nm.

- 1 Table S1 The definition of the emission lines from OES spectrum of MW glow  
 2 discharge decomposition of H<sub>2</sub>-diluted SiCl<sub>4</sub>.

Species	Emission wavelength (nm)	Transition
Si	251.4	$4s^3P_1^0 \rightarrow 3p^2\ ^3P_0$
	288.2	$4s^3P_0^0 \rightarrow 3p^2\ ^1S_0$
SiCl	280.9	$B^2\Delta \rightarrow X^2\Pi_r$
	292.4	$B^2\Sigma^+ \rightarrow X^2\Pi_r$
SiCl <sub>2</sub>	Continuum 310~400	$\overset{9}{A}B_1 \rightarrow \overset{9}{X}A_1$
H	434.4 (H <sub>γ</sub> )	$5d^2D \rightarrow 2p^2P^0$
	486.1 (H <sub>β</sub> )	$4d^2D \rightarrow 2p^2P^0$
	656.3 (H <sub>α</sub> )	$3d^2D \rightarrow 2p^2P^0$
H <sub>2</sub>	Continuum 160~500	$2s^3\Sigma_g \rightarrow 2p^3\Sigma_u$

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