Supporting Information for:

Ambipolar Organic Phototransistors Based on 6,6'-Dibromoindigo

Hyoeun Kim,[a] Gyoungsik Kim,[b] Inho Song,[a] Jungho Lee,[b] Hanum Abdullah,[a] Changduk Yang,[,b] and Joon Hak Oh[*,a]*

[a]Department of Chemical Engineering, Pohang University of Science and Technology (POSTECH), Pohang, Gyeongbuk 790-784, South Korea, E-mail: joonhoh@postech.ac.kr

[b]Department of Energy Engineering, School of Energy and Chemical Engineering, Perovtronics Research Center, Low Dimensional Carbon Materials Center, Ulsan National Institute of Science and Technology (UNIST), 50 UNIST-gil, Ulju-gun, Ulsan 44919, South Korea, E-mail: yang@unist.ac.kr

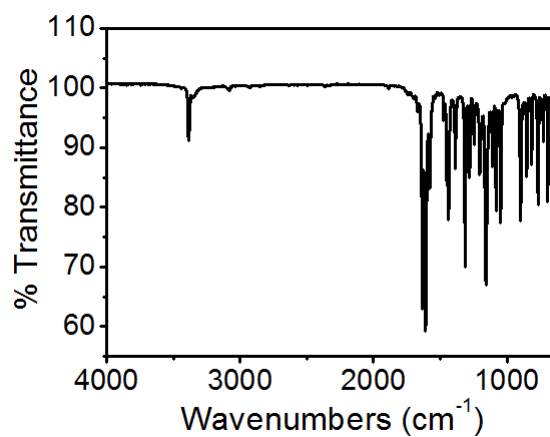**Supporting Figures**

Supplementary Tables

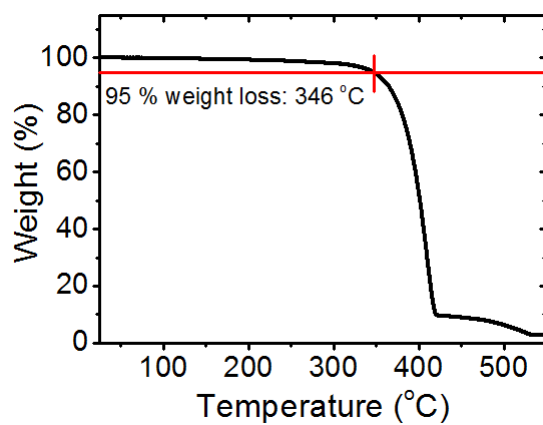**Figure S1.** Infrared spectrum for 6-BrIG.
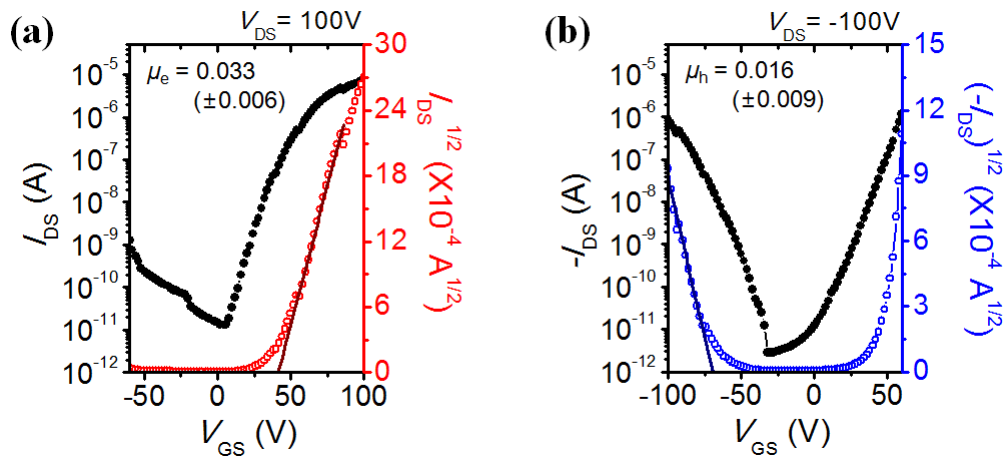

Figure S2. Thermogravimetric analysis of 6-BrIG.

Figure S3. Current-voltage (I_{DS} - V_{GS}) characteristics measured in a N_2-filled glovebox: (a) electron-enhancement operation, V_{DS} = 100 V and (b) hole-enhancement operation, V_{DS} = -100 V.
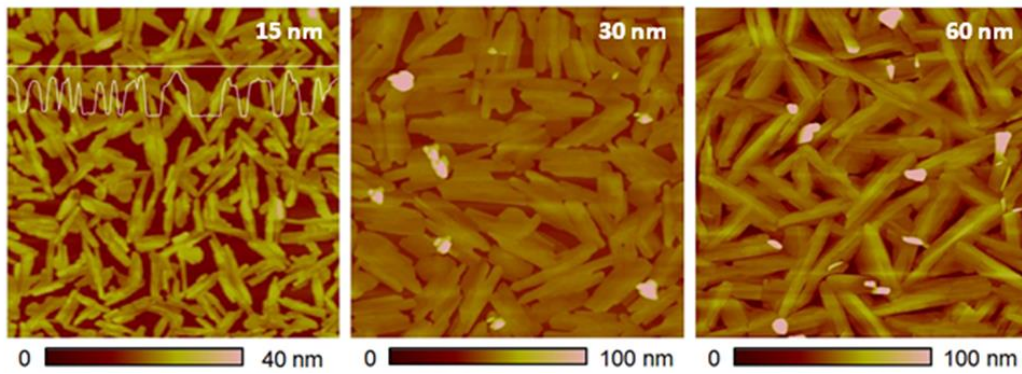

Figure S4. Tapping-mode AFM images (5 μm × 5 μm) of 6-BrIG films with different film thickness on OTS-treated SiO_2/Si substrates annealed at 100°C.
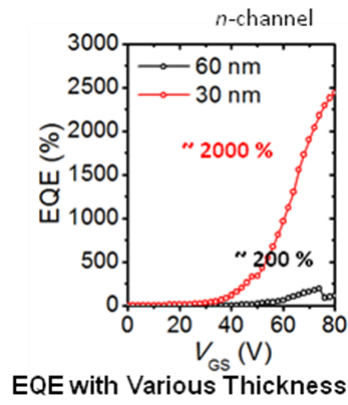
Figure S5. Comparison of the EQE values of 6-BrIG phototransistors with different film thicknesses.
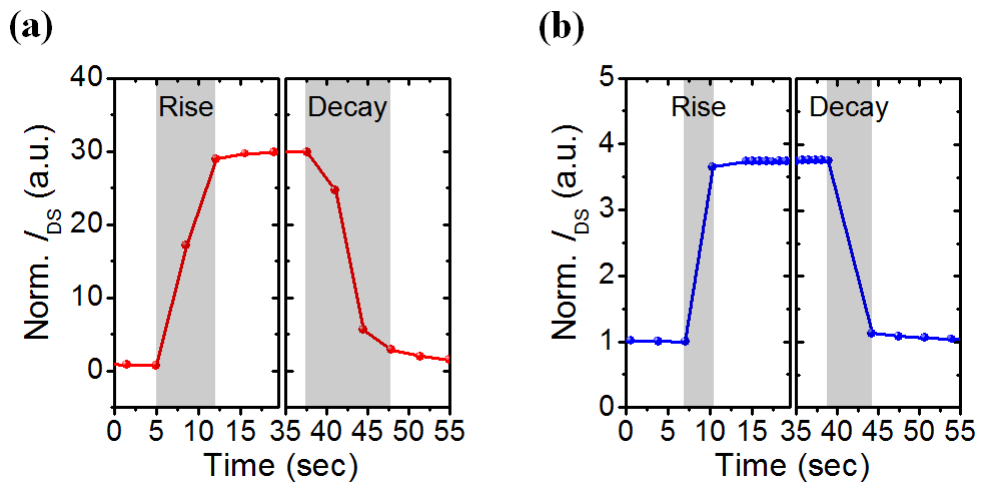

Figure S6. Switch-on and -off photocurrent responses as a function of time at $|V_{GS}| = 20$ V: (a) n-dominant operation applying $V_{DS} = 20$ V and (b) p-dominant operation applying $V_{DS} = -80$ V.
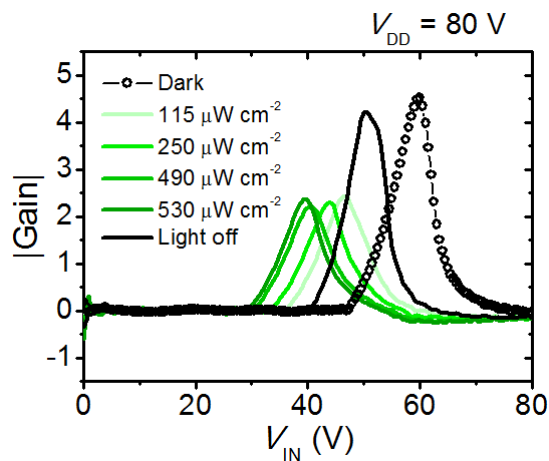
Figure S7. Voltage gain of the complementary inverter in dark and under green light with illumination intensities between 115-530 µW cm^{-2}.

Table S1. OFET performance of 6-BrIG film in the dark and under illumination.

	n-channel			p-channel		
	$\mu_{e,max}{}^a$ (cm^2 V^{-1} s^{-1})	I_{on}/I_{off}	V_{TH} (V)	$\mu_{h,max}$ (cm^2 V^{-1} s^{-1})	I_{on}/I_{off}	V_{TH} (V)
Dark	0.031 $(0.030 \pm 0.0004)^b$	$> 10^7$	43.6	5.8×10^{-4} $(4.9 \pm 0.8) \times 10^{-4}$	$> 10^5$	-51.7
Mono chromic	0.034 (0.032 ± 0.0009)	$> 10^6$	35.8	7.6×10^{-4} $(6.4 \pm 0.5) \times 10^{-4}$	$> 10^3$	-51.2
Poly chromic	0.032 (0.031 ± 0.0006)	$> 10^5$	33.8	8.7×10^{-4} $(7.8 \pm 0.6) \times 10^{-4}$	$> 10^3$	-47.7

[a] The maximum mobilities of the OFET devices (L = 50 µm and W/L = 17.5). [b] The average mobilities and standard deviations are shown in parenthesis