Supplementary Materials

Enhanced Photoluminescence of Hydrogenated Amorphous Silicon Carbide Thin Films by Means of a Fast Thermal Annealing Process

Figure S1. PL normalized of a-Si$_{1-x}$C$_x$:H films annealed at 200 °C, A) Ratio $R_0 = 37.5$ with different RF power deposition from 6 to 15 W, B) Ratio $R_0$ from 37.5 to 75 with a fixed RF power at 15 W.

Figure S2. PL normalized of a-Si$_{1-x}$C$_x$:H films annealed at 400 °C, A) Ratio $R_0 = 37.5$ with different RF power deposition from 6 to 15 W, B) Ratio $R_0$ from 37.5 to 75 with a fixed RF power at 15 W.
Figure S3. PL normalized of a-Si$_{1-x}$C$_x$:H films annealed at 600 °C, A) Ratio R$_0$ = 37.5 with different RF power deposition from 6 to 15 W, B) Ratio R$_0$ from 37.5 to 75 with a fixed RF power at 15 W.

Figure S4. PL normalized of a-Si$_{1-x}$C$_x$:H films annealed at 800 °C, A) Ratio R$_0$ = 37.5 with different RF power deposition from 6 to 15 W, B) Ratio R$_0$ from 37.5 to 75 with a fixed RF power at 15 W.

Figure S5. PL of a-Si$_{1-x}$C$_x$:H films deposited with R$_0$ = 37.5 ratio and 6 W of RF power, annealed at 200 °C, 400 °C, 600 °C, 800 °C, and as-deposited, A) without normalization, B) normalized.
**Figure S6.** PL of a-Si1−xCx:H films deposited with $R_0 = 37.5$ ratio and 9 W of RF power, annealed at 200 °C, 400 °C, 600 °C, 800 °C, and as-deposited, A) without normalization, B) normalized.

**Figure S7.** PL of a-Si1−xCx:H films deposited with $R_0 = 37.5$ ratio and 12 W of RF power, annealed at 200 °C, 400 °C, 600 °C, 800 °C, and as-deposited, A) without normalization, B) normalized.

**Figure S8.** PL of a-Si1−xCx:H films deposited with $R_0 = 37.5$ ratio and 15 W of RF power, annealed at 200 °C, 400 °C, 600 °C, 800 °C, and as-deposited, A) without normalization, B) normalized.
Figure S9. PL of a-Si$_1-x$C$_x$:H films deposited with $R_0 = 50$ ratio and 15 W of RF power, annealed at 200 °C, 400 °C, 600 °C, 800 °C, and as-deposited, A) without normalization, B) normalized.

Figure S10. PL of a-Si$_1-x$C$_x$:H films deposited with $R_0 = 75$ ratio and 15 W of RF power, annealed at 200 °C, 400 °C, 600 °C, 800 °C, and as-deposited, A) without normalization, B) normalized.

Figure S11. X-ray diffraction pattern of a-Si$_1-x$C$_x$:H sample deposited with $R_0 = 37.5$ ratio and 6 W of RF power after a fast annealing process at 800 °C.