High sensitivity microcrack hydroxylated MWCNTs/ ecoflex composite flexible strain sensor based on proton irradiation engineering

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SUPPORTING INFORMATION

Table

Table S1 Changes of hydroxylated MWCNTs sp^2/sp^3 after proton irradiation.

Fluence(e/cm²)	**0**	**1×10¹²**	**5×10¹²**	**1×10¹³**	**1×10¹⁴**
sp^2/sp^3	5.60	4.79	4.47	4.38	3.40

Figure

Figure S1 Raman of hydroxylated MWCNTs after proton irradiation.

Figure S2 Raman of hydroxylated MWCNTs after electron irradiation.

Figure S3 XPS of hydroxylated MWCNTs after proton irradiation.

Figure S4 XPS of hydroxylated MWCNTs after electron irradiation.

Figure S5 FTIR of hydroxylated MWCNTs after proton irradiation.

Figure S6 FTIR of hydroxylated MWCNTs after electron irradiation.

Figure S7 The peak fitting results of Si2p high-resolution XPS binding energy spectrum of flexible substrate before and after irradiation.

Figure S8 The sensing performance of sensors under different strain rates.

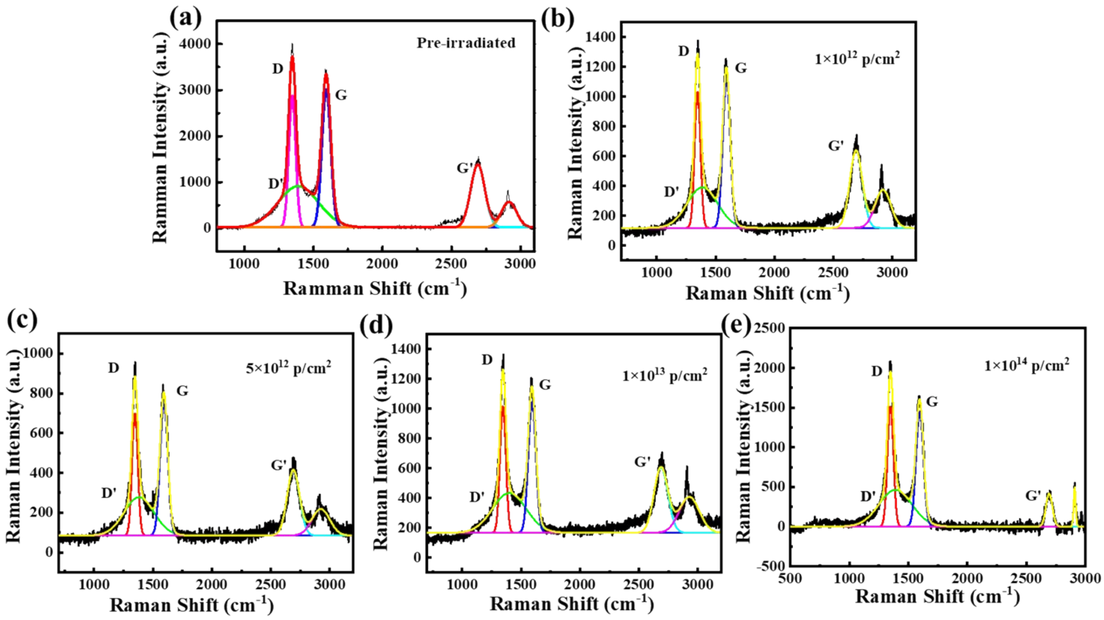

Figure S1

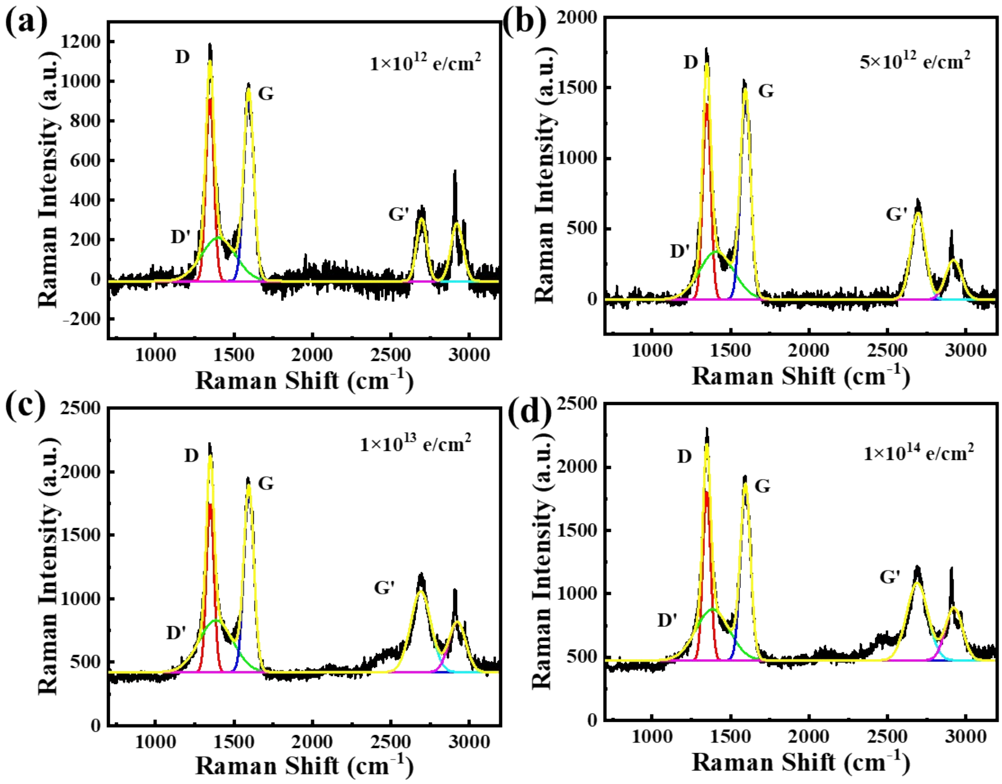

Figure S2

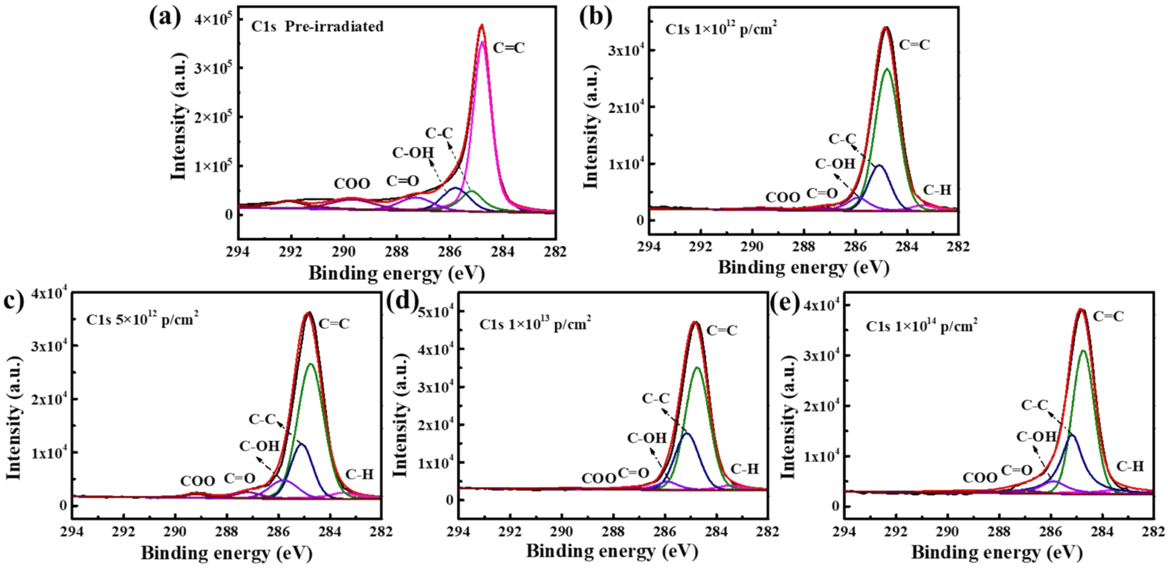

Figure S3

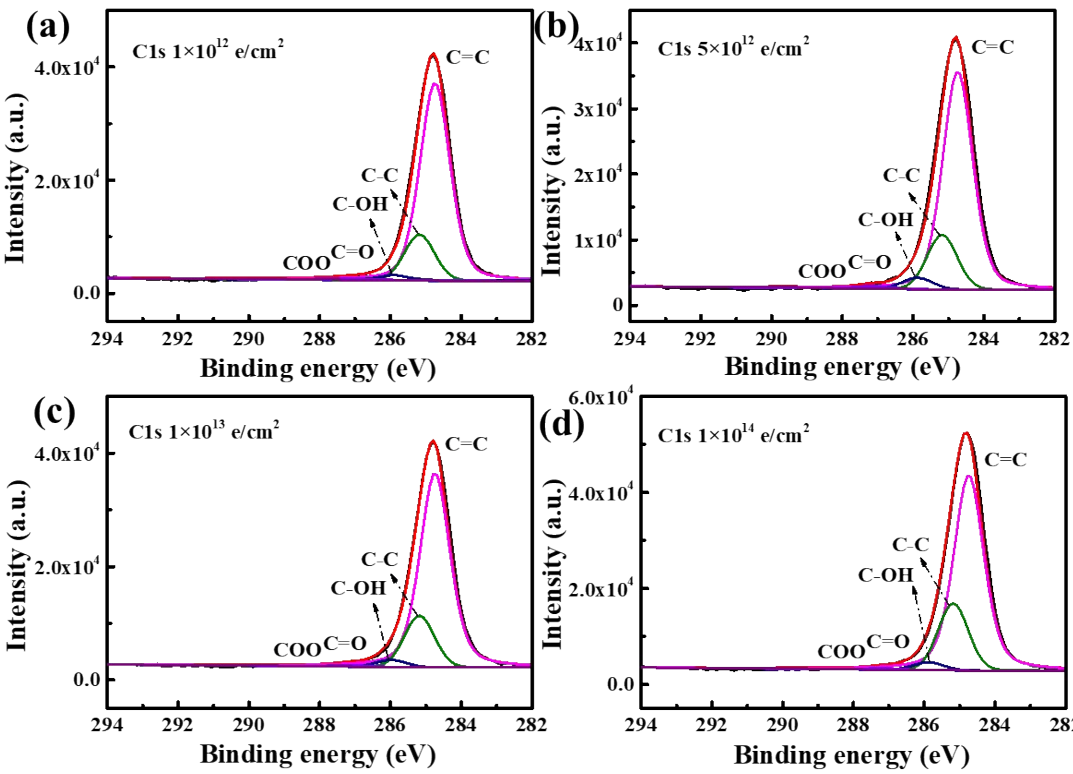

Figure S4

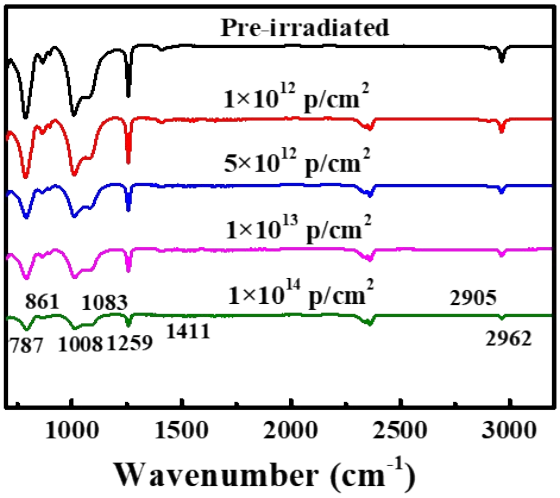

Figure S5

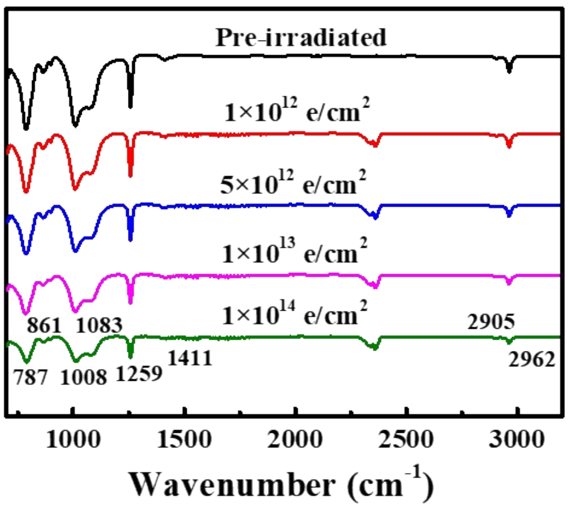

Figure S6

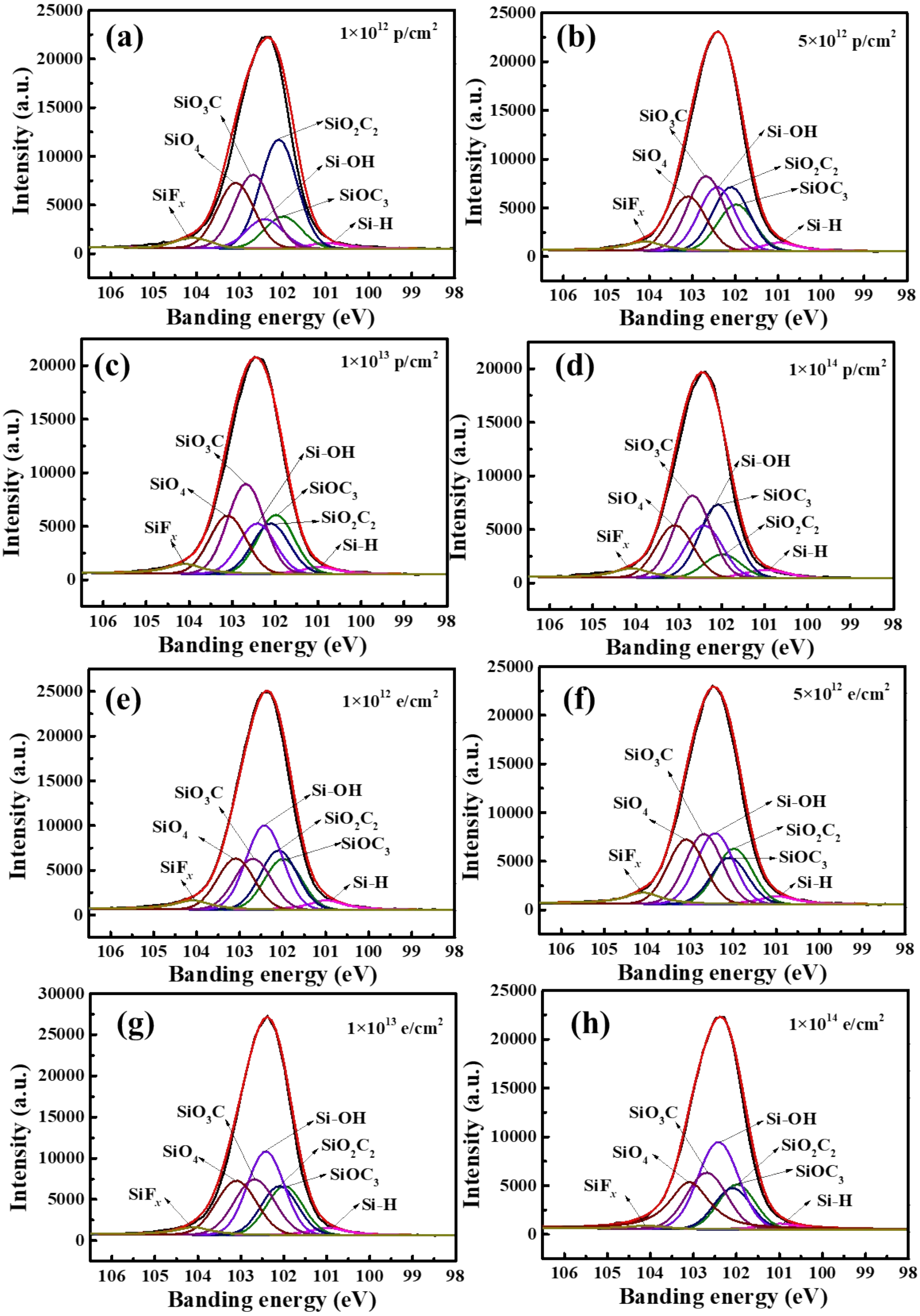

Figure S7

XPS data can be processed by XPSPEAK software, and then the binding energy peaks of different functional groups can be obtained. The contents of different functional groups were obtained by integrating the binding energy peaks of different functional groups.

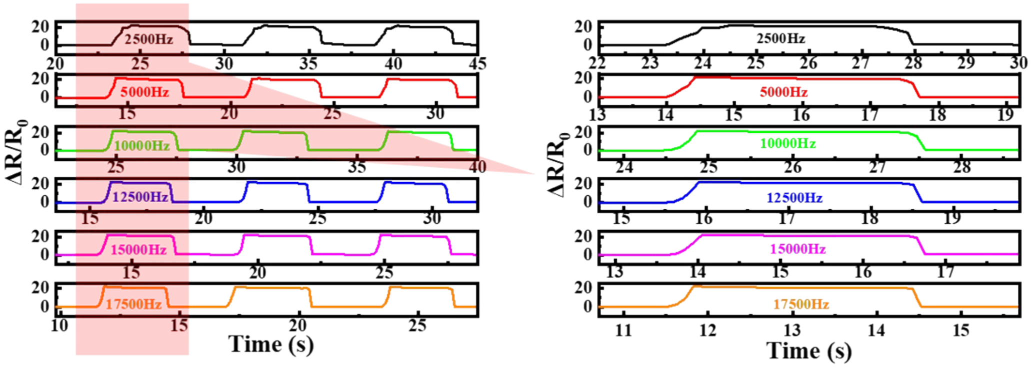

Figure S8

Figure S8 shows the sensing performance of the sensor under different strain rates. Among them, 2500 Hz, 5000 Hz, 1000 Hz, 12500 Hz, 15000 Hz and 17500 Hz, respectively corresponding to 6.25 mm/s, 12.5 mm/s, 25 mm/s, 31.25 mm/s, 37.5 mm/s and 43.75 mm/s. It can be seen from the figure that the responsiveness of the sensor is consistent under different strain rates. However, the change curve of the sensor is unstable at low strain rate. Therefore, it is not advisable to choose a low strain rate during the testing process.