Supporting Information

MXene functionalized collagen biomaterials for cardiac tissue engineering driving iPSC-derived cardiomyocyte maturation

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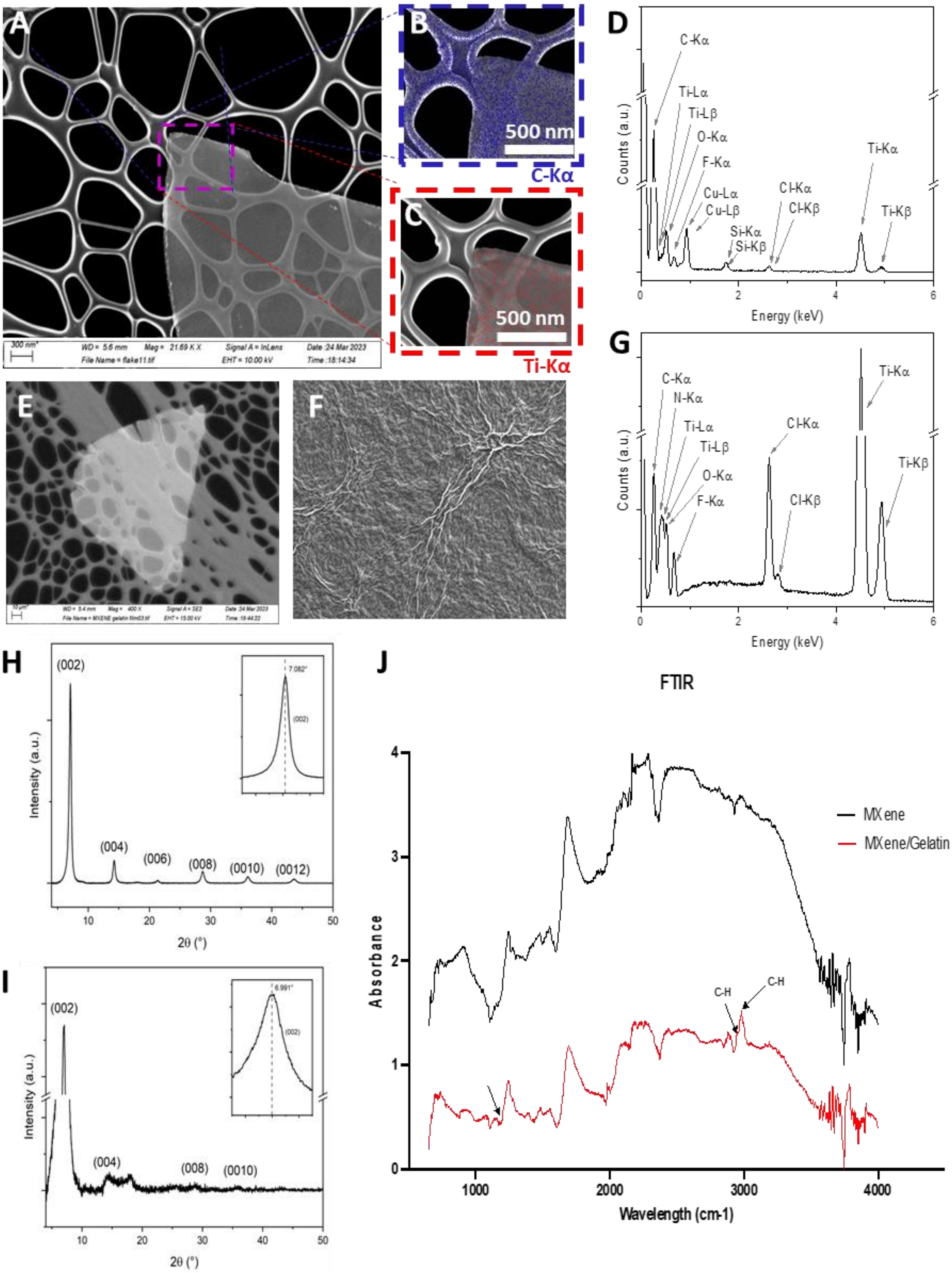
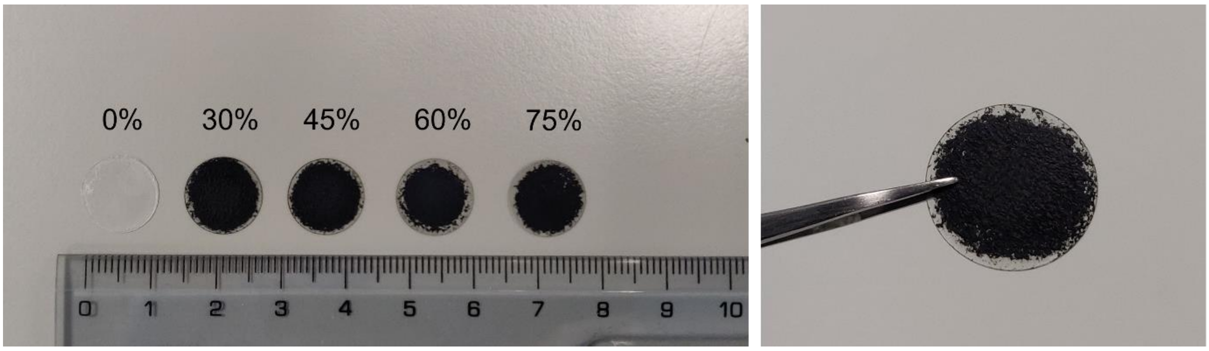


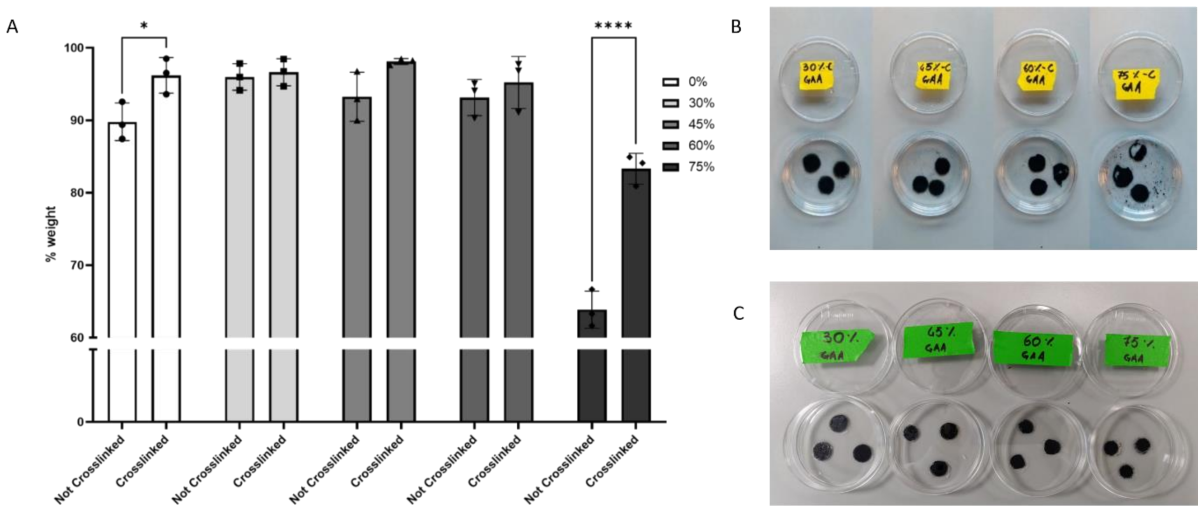
Supplementary Figure 1. (A) Energy dispersive X-ray (EDX) mapping analysis of MXene flakes highlighting Carbon-C in blue (also present in the grid) and Titanium-Ti in red. (D) sum of the EDX spectra highlighting the carbon and titanium spectra, with minute signal from Silicon-Si which emanates from the detector itself which is typical of such thin samples. (E) Gross overview of MXene flake. (F) SEM of MXene/Gelatin cast film with (G) corresponding

EDX analysis. Nitrogen-N line evident due to gelatin presence and overlap with Ti-L lines. (H) X-Ray diffraction (XRD) of MXene flakes exhibiting a typically clean (001) reflection. (002) at 7.082 gives d-spacing of 12.48 Å, interlayer spacing of 3.08 Å, based on dry multilayer spacing of 9.40 Å [S1]. (I) XRD of MXene|Gelatin cast films with a shift down in MXene (002), giving an increase in on average (12.64 Å), interlayer spacing increases to 3.24 Å, most likely due to gelatin between MXene layers. Peak at $2\theta = \sim 18$ is attributed to the presence of MXene [S2]. (J) FTIR analysis of MXene biohybrid platform demonstrating the presence of peaks characteristic to gelatin such as 2938 cm^{-1} and 2968 cm^{-1} representing C-H bonds, as well as 1160 cm^{-1} representing carboxyl-group stretching vibration.



Supplementary Figure 2. Biohybrid platforms casted on glass coverslips.

Supplementary Figure 3. On the left, an inhomogeneous solution of collagen and MXene; on the right a more uniform solution of collagen and MXene when gelatin is added as a dispersant/surfactant to MXene prior to mixing with solubilised collagen .



Supplementary Figure 4. Dissolution test comparison between not crosslinked biohybrid platforms and crosslinked ones. A) Weight percentage (%) after degradation test of not cross-linked and cross-linked of 0%, 30%, 45%, 60% and 75% w/w MXene biohybrid platform at day 10. B) Micrographs of non-crosslinked biohybrid platforms after 10 days. For 75% w/w MXene biohybrid platforms many floating particles can be observed in PBS. C) Micrographs of cross-linked biohybrid platforms after 10 days. Statistical analysis was performed using a one-way ANOVA with Tukey's multiple comparison where a resultant p-value or less than or equal to 0.05 was considered significant. Bars represent the mean whereby error bars depict ± standard deviation.

Supporting Information References:

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