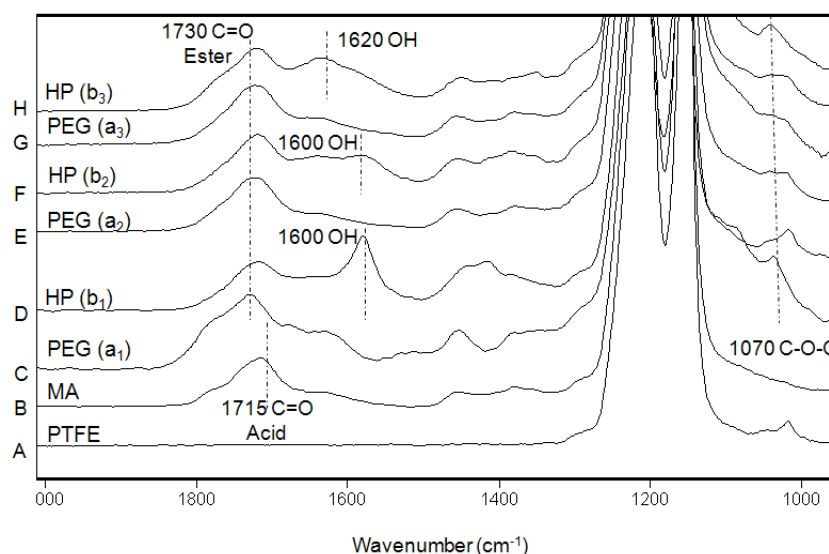


## Supporting Documents

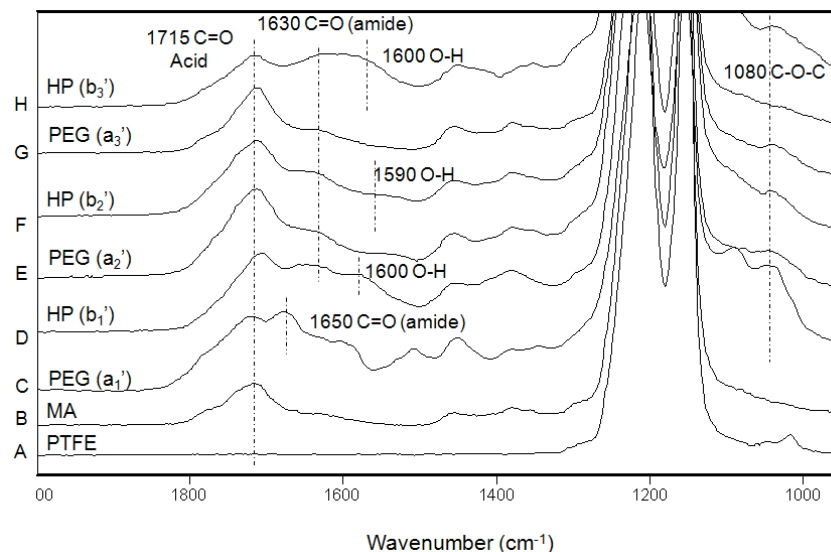
To confirm covalent attachment of the PEG and HP layers, ATR FT-IR spectroscopy was utilized as illustrated in Figure S-1-a and b. As seen in Figure S-1-a, the first MA layer is obtained by COOH-PTFE showing the band at  $1715\text{ cm}^{-1}$  due to C=O of COOH groups. The reactions of COOH functionalized PTFE with OH-PEG lead to ester formation (C=O). The alternating layers of HP and OH-PEG also produce ester linkages. The ATR FT-IR spectrum of the first PEG layer ( $a_1$ ) shows the band at  $1730\text{ cm}^{-1}$  due to ester linkages between the COOH-PTFE and OH-PEG. The band at  $1070\text{ cm}^{-1}$  due to C-O-C of PEG was also detected. The first heparin layer ( $b_1$ ) was attached in the next step which is manifested by the presence of the band at  $1730\text{ cm}^{-1}$  due to ester linkages that result from the reactions of COOH of HP and OH of PEG as well as the band at  $1600\text{ cm}^{-1}$  due to the OH bending modes of heparin. These results confirm the covalent attachment of OH-PEG and HP layers on the COOH-PTFE surface. Since the ester band formation of second ( $a_2$  and  $b_2$ ) and third layers ( $a_3$  and  $b_3$ ) is identical to those produced in the first layer ( $a_1$  and  $b_1$ ), higher intensities of the bands at  $1730\text{ cm}^{-1}$  due to ester linkages between PEG and HP layers and at  $1620$  and  $1600\text{ cm}^{-1}$  due to OH bending vibration of heparin are also detected, confirming the covalent attachment of OH-PEG and HP layers to COOH-PTFE surface.

An alternative path of reactions to produce CAM was to utilize  $\text{NH}_2$ -PEG, where reactions of COOH-PTFE and  $\text{NH}_2$ -PEG lead to amide formation (C=O-NH), also producing the alternating layers of HP and  $\text{NH}_2$ -PEG amide linkages. ATR FT-IR spectra shown in Figure S-2-b illustrate the presence of the band at  $1715\text{ cm}^{-1}$  due to C=O of COOH entities in the first COOH-PTFE layer (MA) resulting from the microwave

plasma reactions and at  $1650\text{ cm}^{-1}$  due to amide linkages produced from the reactions of COOH-PTFE and  $\text{NH}_2$ -PEG ( $a_1'$ ) and again the band at  $1080\text{ cm}^{-1}$  due to C-O-C of PEG was detected. The next reacted layer is heparin ( $b_1'$ ), which is also manifested by the bands at  $1630\text{ cm}^{-1}$  due to  $\text{NH}_2$  linkages resulting from the reactions of COOH of HP and  $\text{NH}_2$  of PEG and the  $1600\text{ cm}^{-1}$  band attributed to OH bending vibrations of heparin, confirming covalent attachment of  $\text{NH}_2$ -PEG and HP layers. Again, as subsequent layers are reacted, the band intensities increase, indicating that the multiple layers of  $\text{NH}_2$ -PEG and HP were covalently attached to the COOH-PTFE surfaces.



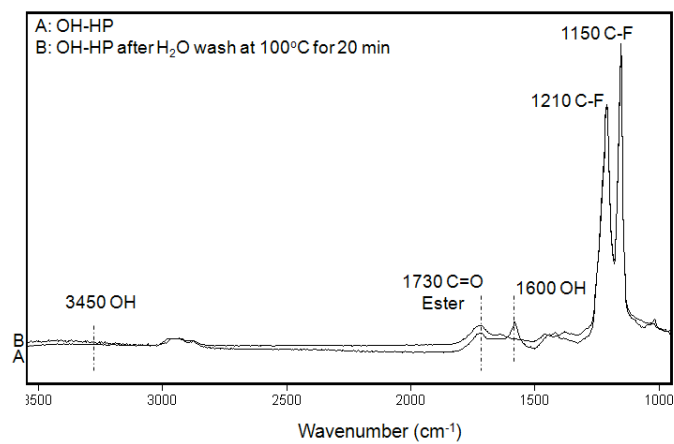
a



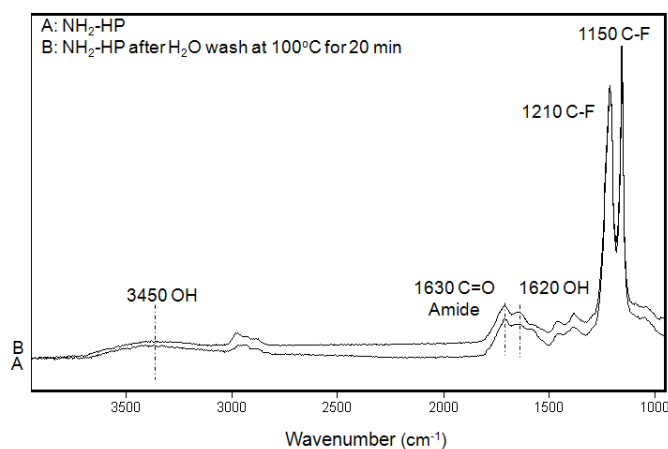
b

Figure S-1. ATR FT-IR spectra in the 1900-1000  $\text{cm}^{-1}$  region of each CAM layer; (a) ester linkages of OH-PEG: Trace A- PTFE, Trace B- MA, Trace C- PEG ( $a_1$ ), Trace D- HP ( $b_1$ ), Trace E- PEG ( $a_2$ ), Trace F- HP ( $b_2$ ), Trace G- PEG ( $a_3$ ), Trace H- HP ( $b_3$ ); and (b) amide linkages of  $\text{NH}_2$ -PEG: Trace A- PTFE, Trace B- MA, Trace C- PEG ( $a_1'$ ), Trace D- HP ( $b_1'$ ), Trace E- PEG ( $a_2'$ ), Trace F- HP ( $b_2'$ ), Trace G- PEG ( $a_3'$ ), Trace H- HP ( $b_3'$ ).

Hydrolytic stability of the CAM surfaces containing OH- and  $\text{NH}_2$ -PEG was determined by exposing each specimen to boiling water for 20 min while stirring. The IR analysis shown in Figure S-2-a-c show that the C=O bands at 1730 and 1630  $\text{cm}^{-1}$  due to ester and amide linkages before and after boiling are undistinguishable, thus indicating stability of the CAM layers.



a



b

Figure S2. ATR FT-IR in the 4000-1000  $\text{cm}^{-1}$  region of the CAM surfaces before and after  $\text{H}_2\text{O}$  wash at 100 °C for 20 min of (a) OH-HP and (b)  $\text{NH}_2$ -HP.

In an effort to control hemocompatibility performance of heparinized materials, uniformity of PEG and HP modified surface is important. This is primarily related to the fact that the presences of unevenly areas of HP allow unwanted platelet adherence and aggregation. As illustrated in Figure S-3, the SEM images of the unmodified PTFE exhibits a certain degree roughness. After plasma modification (MA-PTFE) and CAM process (OH-HP and  $\text{NH}_2$ -HP) the surfaces become smoother.

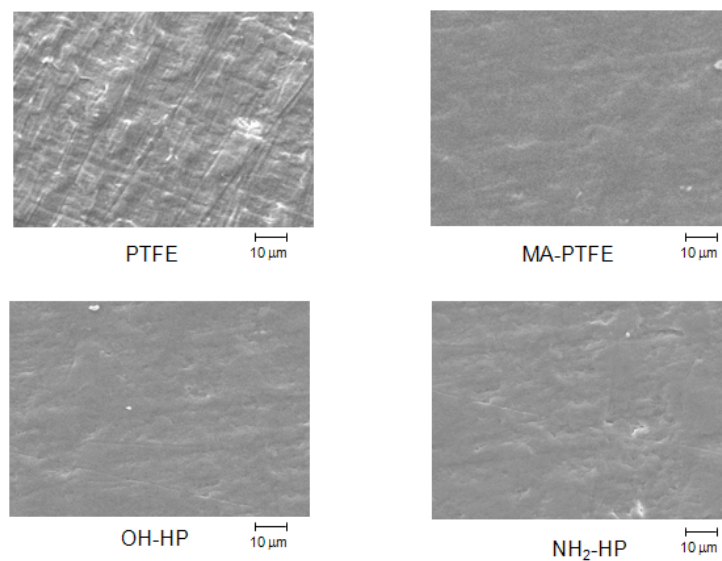


Figure S3. SEM images of PTFE, MA-PTFE, OH-HP, and NH<sub>2</sub>-HP surfaces.

The smoothness alone indicated good surface coverage, but does not prove complete coverage. Therefore, IRIRI were conducted. Figure S-4 illustrate IRIRI images and IR spectra of the surface containing (a) OH-PEG, (b) NH<sub>2</sub>-PEG, (c) OH-HP, and (d) NH<sub>2</sub>-HP recorded from random areas of the surface. As seen from the spectra, the layer formed on the surface shows chemically homogenous distribution of these species by tuning to the bands characteristic of C-O-C (PEG), and O-H (HP).

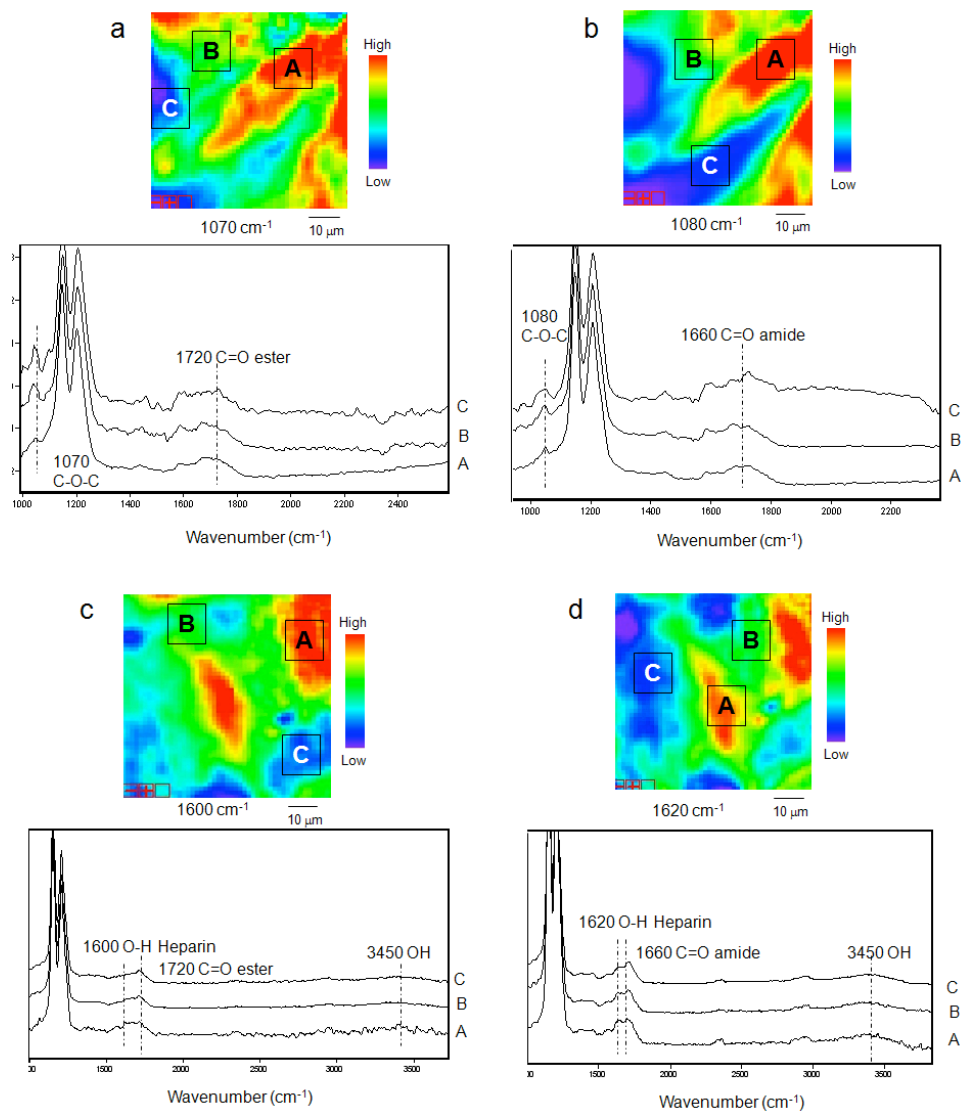


Figure S4. IRIR images and IR spectra recorded from random areas A, B, and C of (a) OH-PEG, (b) NH<sub>2</sub>-PEG, (c) OH-HP, and (d) NH<sub>2</sub>-HP surfaces.