Haloarchaeal poly poly[(3-hydroxybutyrate)-co-(3-hydroxyvalerate)] composite films reinforced with graphene nanoplatelets as a biomaterial for skin tissue engineering.

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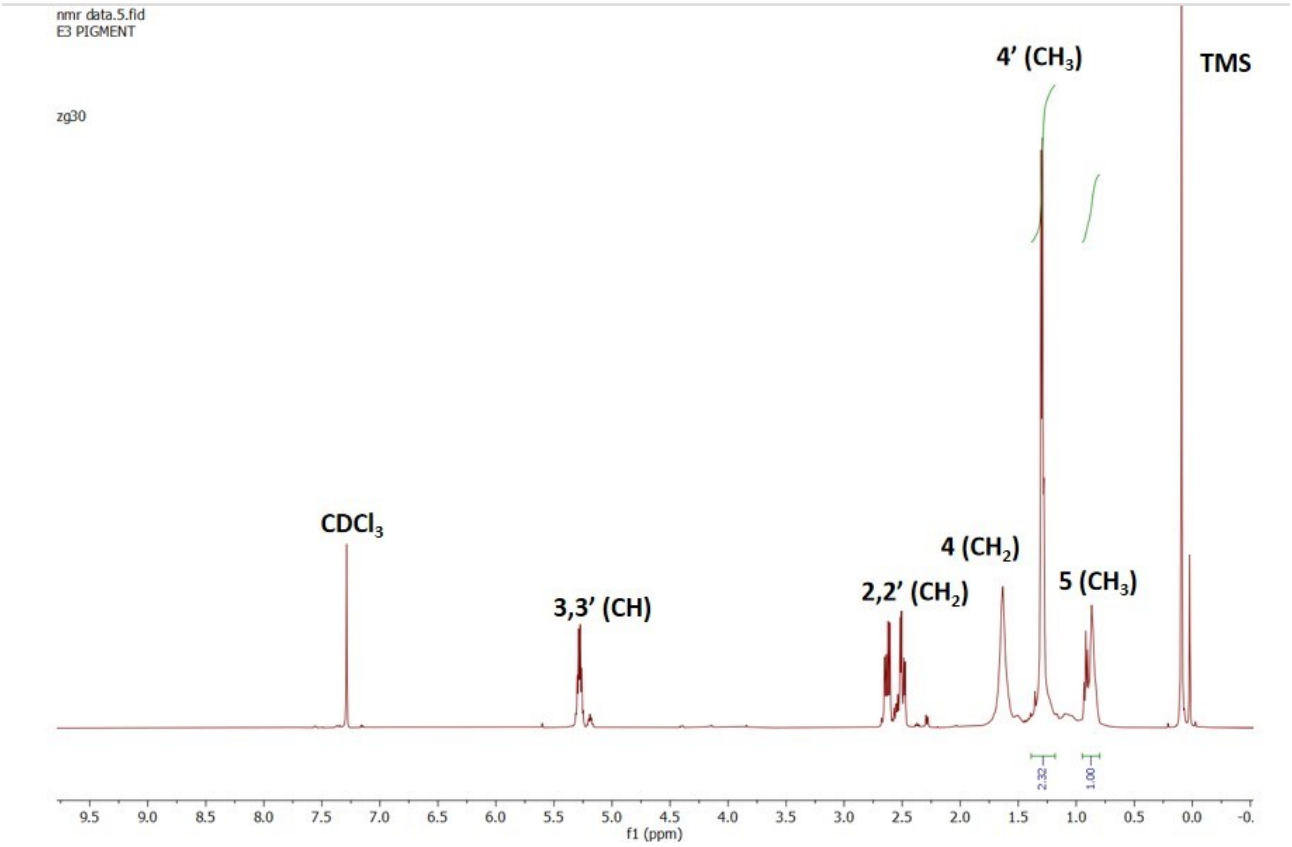
Supplementary data:

S1

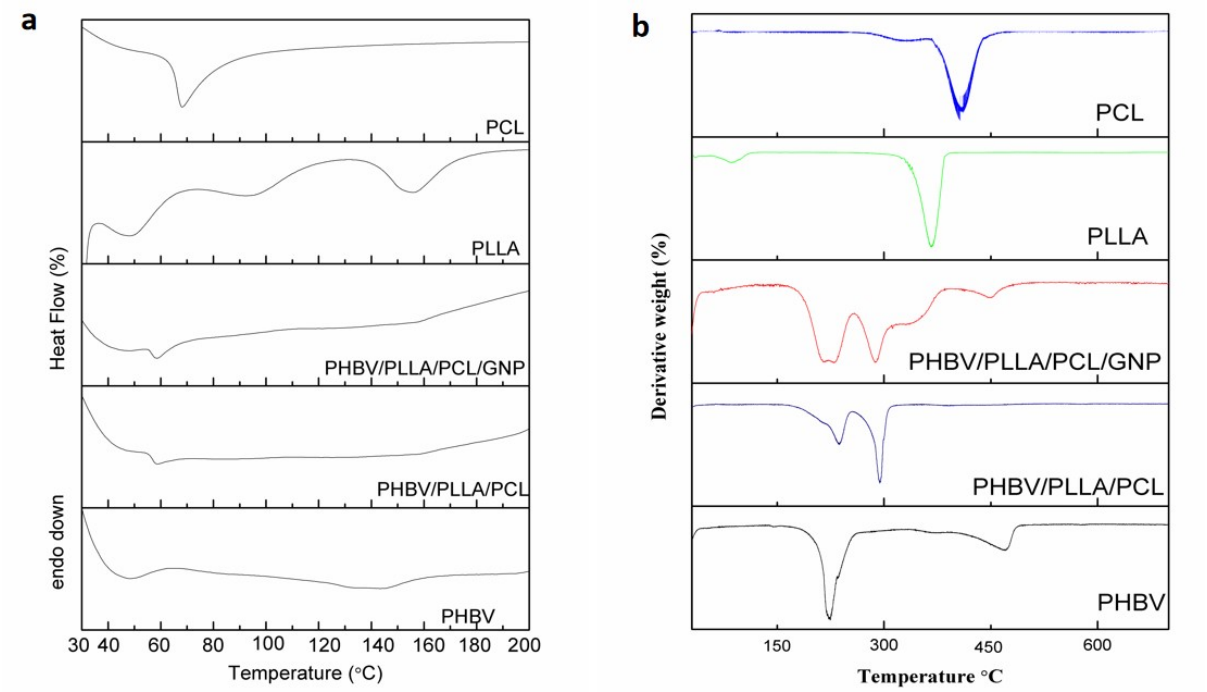


S1 - ^{1}H NMR of *Hgm. borinquense* E3 derived PHBV polymer

$$\text{HV COMPOSITION (\%)} = \frac{\text{Area of } CH_3 \text{ (HV)}}{\text{Area of } CH_3 \text{ (HV)} + \text{Area of } CH_3 \text{ (HB)}} \times 100$$

HV area = 1.00
HB area = 2.32
therefore 1/1+2.32 = 1/3.32
Therefore % HV is 30%

S2

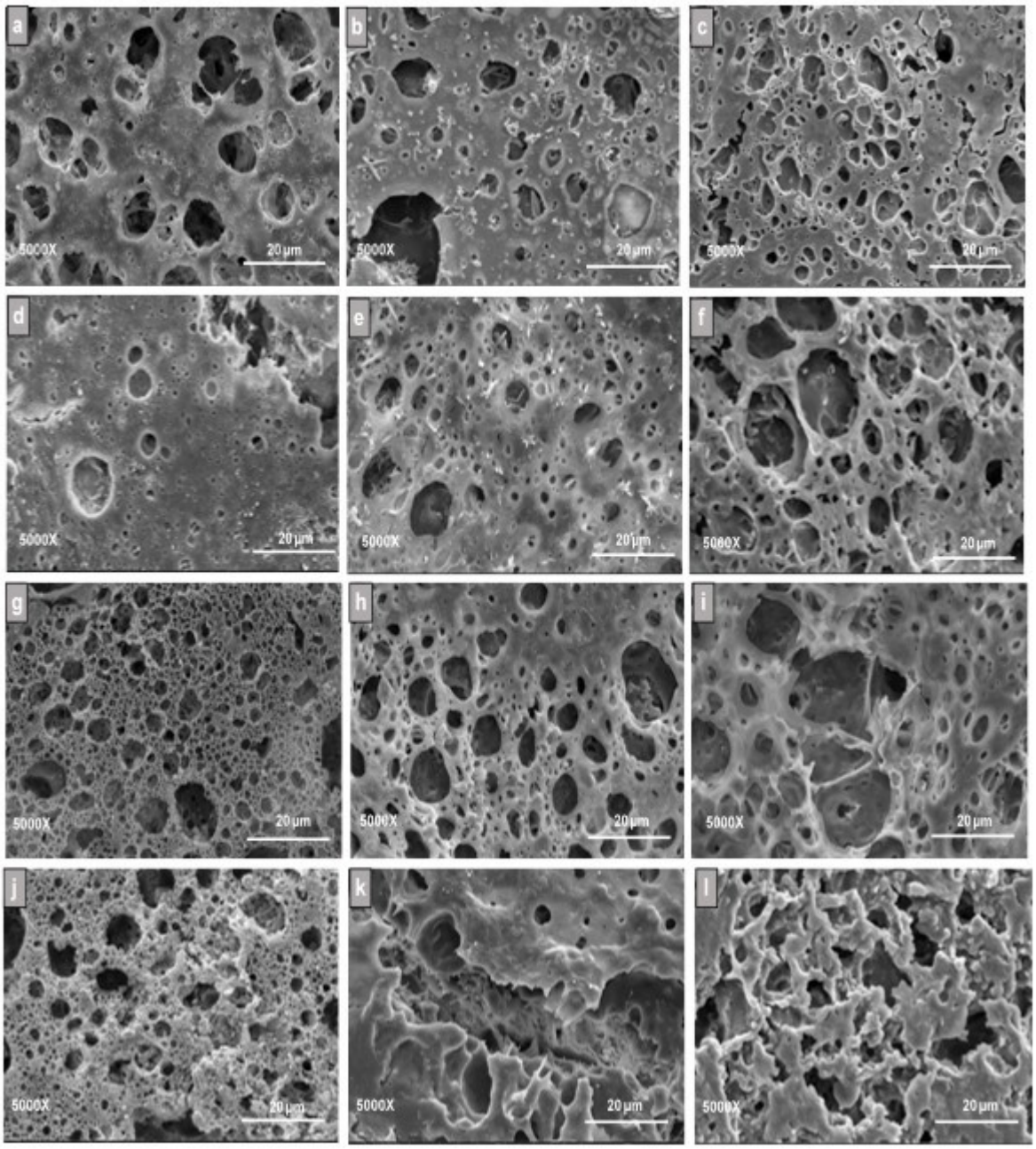


c

Temperature	PHBV	PHBV/PLLA/PCL	PHBV/PLLA/PCL / GNP	PLLA	PCL
250℃-200℃	11%	9%	9%	13%	1%
200℃-350℃	42%	60%	37%	17%	13%
350℃-500℃	23%	5%	9%	66%	84%
500℃-700℃	21%	1%	2%	1%	1%
Residue	22%	25%	43%	3%	1%

S2- a) DSC b) DTG and c) weight loss of *Hgm. borinquense* E3 derived PHBV, PHBV/PLLA/PCL, PHBV/PLLA/PCL/GNP, PLLA and PCL.

S3



S3- Ultrastructure of the haloarchaeal PHBV and its composites exposed to the action of lysozyme for a particular time point. Panels a, b, and c depict the *in vitro* degradation of the *Hgm. borinquense* E3 derived PHBV, PHBV/PLLA/PCL and the PHBVPLLA/PCL/GNP films respectively after 7 days. Panels d, e, and f represent the haloarchaeal PHBV, PHBV/PLLA/PCL, and PHBV/GNP films after 14 days of degradation. Wider pores can be seen in the films. Panels g, h, and i show the 21-day degradation of the haloarchaeal PHBV, PHBV/PLLA/PCL, and PHBV/GNP film. At the end of 28 days, the *Hgm. borinquense* E3 film is observed to be highly porous (shown in panel j). The PHBV/PLLA/PCL film (panel k) and the PHBV/PLLA/PCL/GNP film (panel l) also show deep cracks on the surface indicating a gradual loss of structural integrity of the films.