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1. 概要(Summary)

In this project, we have investigated the cell structure of nanocellular foams using the SEM at Nanohub. Thin films of PMMA-b-PtBA were prepared by solution casting. Nanocellular foams were created within the thin film by UV-induced chemical foaming, where isobutene is created from the side-chain cleavage of the polymer. The effect of the polymer specifications on the cell structure was studied

2. 実験(Experimental)

【利用した主な装置】

超高分解能電界放出形走査電子顕微鏡, 走査型プローブ顕微鏡システム, 分光エリプソメーター

【実験方法】

The self-assembled morphology was observed by SEM with 10 kV accelerating voltage and 1 μA electron current. Prior to the measurements, approximately 1 nm of Pt was spluttered on the sample.

3. 結果と考察(Results and Discussion)

The effect of the polymer specifications on the UV-induced chemical foaming process was studied. In the experiments, PMMA-b-PtBA films with PMMA:PtBA of 1:1 and 1:3 were prepared bya solvent casting in chloroform with 5 wt% PAG. SAXS and TEM results indicated that the self-assembly took place during the solvent casting resulting in a lamella morphology and cylindrical morphology for the 1:1 and 1:3 samples respectively. After the samples were casted, they were foamed at 80°C for 5 minutes. For the sample with PMMA:PtBA of 1:1, nanocellular elongated pore structures were observed after the foaming as sown in Fig. 1(a). In the other, small well-ordered spherical domains were observed for the 3:1 sample as shown in Fig. 1(b).

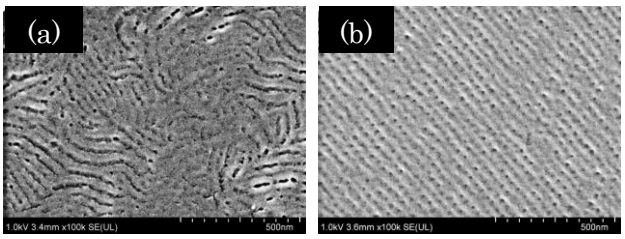

Fig. 1: SEM images of PMMA-b-PtBA films with PMMA:PtBA of (a) 1:1 and (b) 3:1 foamed at 80°C for 5 minutes.

4. その他・特記事項(Others)

参考文献:

[1] P. Rattanakawin et al., J. PHOTO -POLYM SCI TEC **31(5)**, 2018, 647

[2] P. Rattanakawin et al., J PHOTOPOLYM SCI TEC **32(5)**, 2019, 693

[3] P. Rattanakawin et al., ACS MACRO LETT. **9(10)**, 2020, 1433

5. 論文・学会発表(Publication/Presentation)

なし。

6. 関連特許(Patent)

なし。