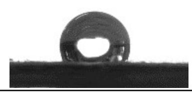
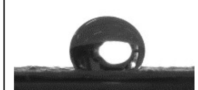
Supporting data 1

Water contact angle measurement of the composite membranes

The water contact angle measurements of the composite membranes were carried out by a Samsung FACED camera (Korea). A droplet of distilled water was placed on the plane surface of the composite membrane and a digital image of the drop was taken after 10 seconds. The water contact angle was measured using an image processing program. More than five measurements on different locations of each composite membrane were tested and the average value was taken.

Table S1.1: Water contact angle of PCL fiber membrane and the composite fiber membranes

Sample	Water contact angle	Images
PCL	122.9 ± 1.15	
PCL/GO	113.3 ± 0.67	
PCL/ZG	115.2 ± 0.64	
PCL/PZG	Rapid adsorption	-
PCL/PZG/BBR	Rapid adsorption	-

The contact angle analyses were measured in order to evaluate the effect of the different components on the wettability of the electrospun composite membranes (Table S1.1). The electrospun PCL membrane had a water contact angle of 122.9 ^{o}, indicating its high hydrophobic feature. By the addition of GO and ZnO NPs, the water contact angle of the composite membranes was reduced to 113.3 ^{o} and 115.2, respectively, due to the abundant hydrophilic GO sheets and ZnO NPs on the PCL fibre surface. With the addition of PEG in PCL/PZG and PCL/PZG/BBR fibers, it was not possible to measure the contact angle since the water droplet was quickly absorbed on the surface of the membrane due to the hydrosoluble PEG component, leading to increases the hydrophilicity of composite membranes. Thus, the addition of PEG improved the wettability of PCL fibers, and this was actually a desirable feature of the fibre membrane for potential application as a wound dressing and drug delivery system.

Supporting data 2

The impact of each component (GO, ZnO, and BBR) on the performance of the PCL composite nanofibers

As can be seen in Table S2.1, the fixity and recovery ratios of PCL fiber membrane increased with the increase of GO content in the range of 0.5 to 1.0 wt%. However, when the proportion of GO was 1.25 wt%, the fixity and recovery ratios of PCL fiber membrane simultaneously reduced, probably attributing to the formation of GO clusters in PCL fibers at a high content. Therefore, GO content of 1.0 wt% was used for further investigating the shape memory performance of the PCL composite membranes containing other additives.

Table S2.1. Effect of GO content on fixity and recovery ratios of PCL fiber membrane

Sample	R_f (%)	R_r (%)
PCL 20 wt%	95.3± 2.6	22.8 ± 0.7
PCL-GO 0.5 wt%	99.4 ± 0.27	30.9 ± 2.67
PCL-GO 0.75 wt%	98.6 ± 0.51	33.9 ± 1.03
PCL-GO 1.0 wt%	98.0 ± 0.6	40.8 ± 0.8
PCL-GO 1.25 wt%	97.9 ± 0.34	34.1 ± 2.93

Effect of ZnO content on fixity and recovery ratios of PCL fiber membrane is shown in Table S2.2. The recovery ratio of PCL fiber membrane was increased with the increase of ZnO content, reaching a value of 35.33 ± 0.24 % at ZnO content of 0.6 wt%. However, the electrospinning process could not be performed stably at ZnO content above 0.6 wt%.

Table S2.2. Effect of ZnO content on fixity and recovery ratios of PCL fiber membrane

Sample	R_f (%)	R_r (%)
PCL 20 wt%	95.30 ± 2.60	22.80 ± 0.70
PCL-ZnO 0.2 wt%	97.13 ± 0.22	25.87 ± 0.59
PCL-ZnO 0.4 wt%	98.74 ± 0.24	27.75 ± 0.35
PCL-ZnO 0.6 wt%	97.99 ± 0.73	35.33 ± 0.24

In this study, the highest content of BBR that is able to be incorporated into PCL fiber membrane was aimed in order to achieve the highest concentration of BBR released. The lower BBR concentration may cause loss of antibacterial activity of the

PCL composite membrane. When the content of BBR was higher than 1.0 wt%, the BBR could not completely dissolve in the polymer solution. Thereafter, the composite fiber membrane containing 1.0 wt% of BBR was investigated for shape memory performance, release behavior, and antibacterial ability.