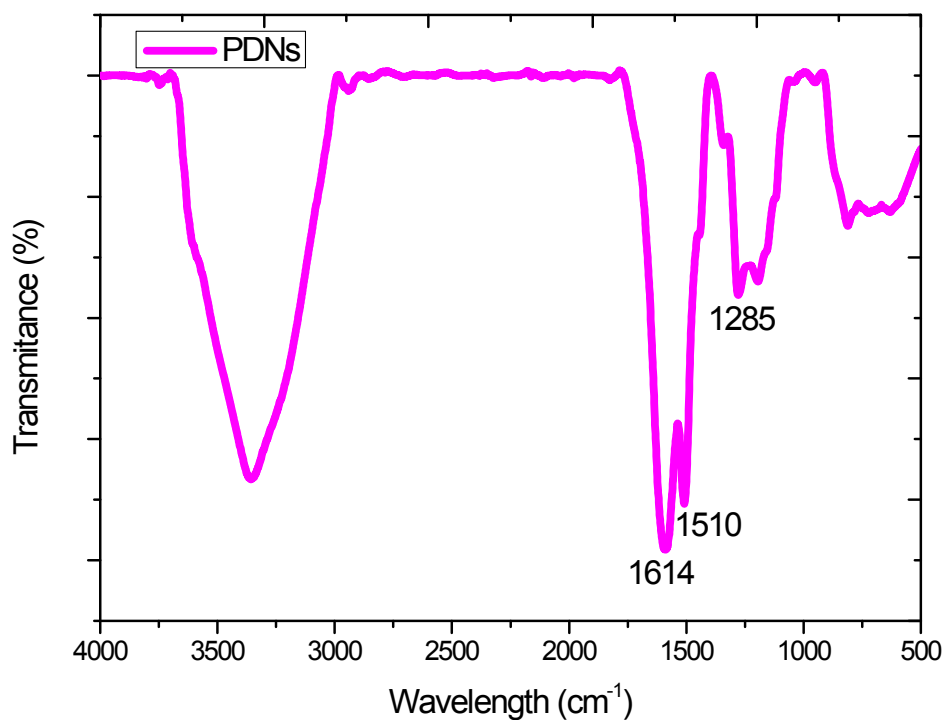


## Supporting Information

# Mussel inspired locomotive: The Moisture Induced Actuation in a Poly (vinyl alcohol) Film Containing Melanin- Like Dopamine Nano Spheres

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**Figure S1.** FTIR-ATR spectra of PDNs

## Evaluation of folding force

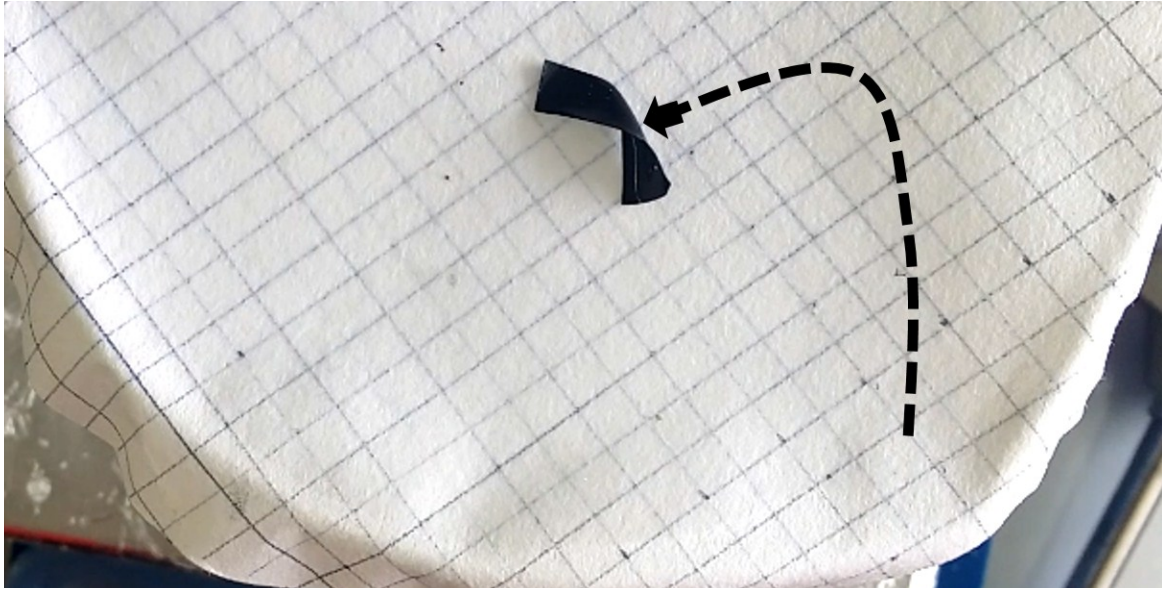


Figure S2.

### Calculation of twisting force

Distance covered by film in movie S14 = 4cm

Time = 60 sec

Mass of film = 50-mg with dimension of 3cm x 0.5 cm

Displacement or velocity = Distance covered / time

$$0.04/60 = 0.7\text{mm/sec}$$

Acceleration = Displacement / time

$$0.00067/60 = 11\mu\text{m}^2/\text{sec}$$

Therefore, Twisting force = mass x Acceleration

$$0.050 \times 0.000011 = 0.6 \mu\text{N}$$

### Movie are provided as follows:

**Movie S1.** A rectangular 260- $\mu\text{m}$ -thick 1.5 cm x 3 cm PVA@PDNs film is lifting and moving a 250% (~ 1 cm long, ~ 20 mg each  $\times 6$ ) load more than its weight of silver wires over a 40 °C moist filter paper substrate covering the source of water vapor.

**Movie S2.** Triangular film 260- $\mu\text{m}$ -thick 1.5 cm x 3 cm PVA@PDNs film flipping and moving on a 40 °C moist filter paper substrate.

**Movie S3.** A star shaped 100- $\mu\text{m}$ -thick PVA@PDNs film placed on a bare fingertip folds fell off as a result of moisture existence on human palms.

**Movie S4.** Rectangular 260- $\mu\text{m}$ -thick 0.5 cm x 3 cm PVA@PDNs film in a twisting movement over a 40 °C moist filter paper substrate.