Supporting Information for Publication

Metal Organic Framework Coated Vesicular Nano-aggregates: An Intelligent 'Vehicles' for Sustained and Leakage Proof Release of Doxorubicin

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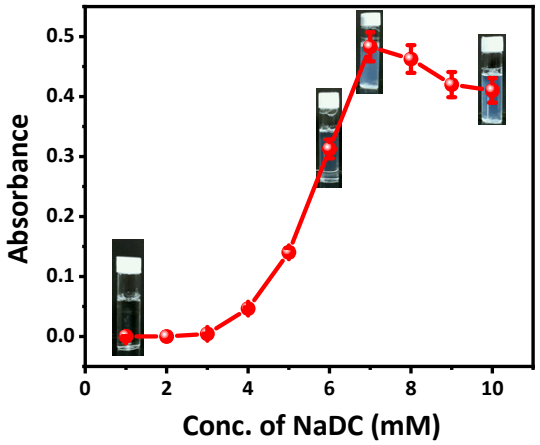


Figure S1: Turbidity measurement for studying the Morphological Transformation, from micellar aggregates to vesicular nano-aggregates.

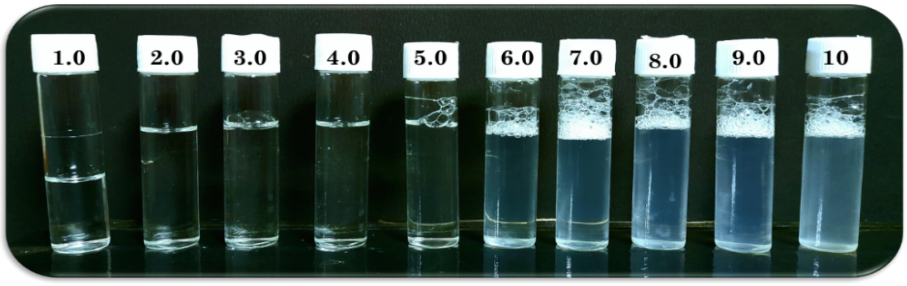


Figure S2: Visual Images of C_{12}EMorphBr with different concentration of NaDC (1.0 mM - 10 mM).

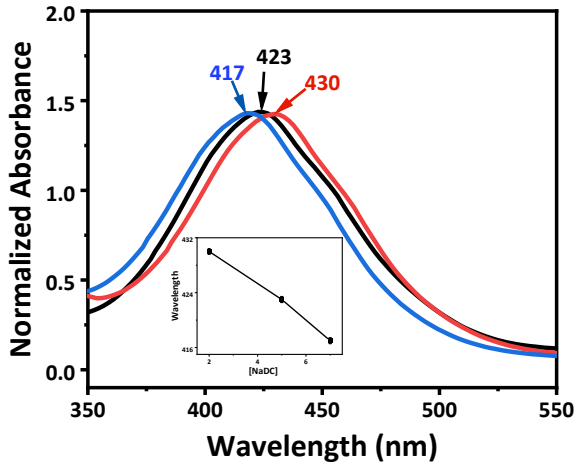


Figure S3. Normalized absorbance plot of aqueous solution of C_{12}EMorphBr in the presence of MO with varied NaDC concentration. [2 mM- 430 nm, 5 mM- 423 nm, 7.0 mM-417 nm]

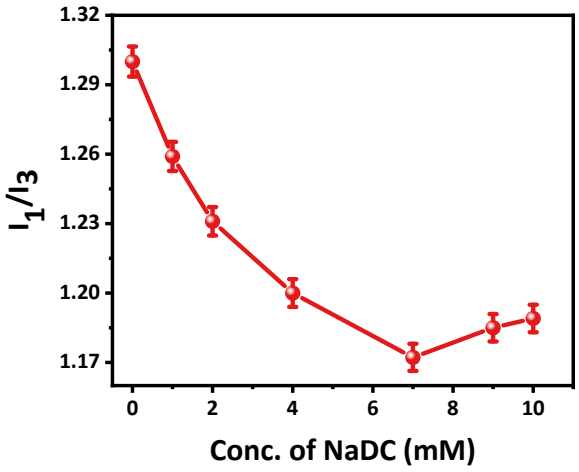
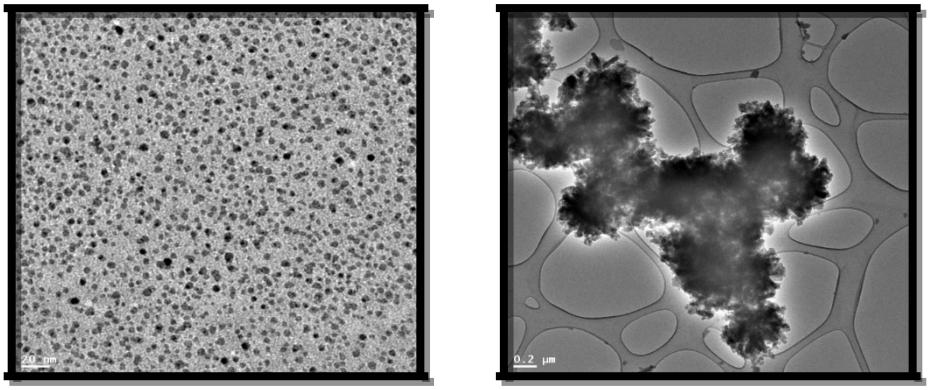


Figure S4: The variation of I_1/I_3 in aqueous solution of C_{12}EMorphBr at different NaDC concentrations.

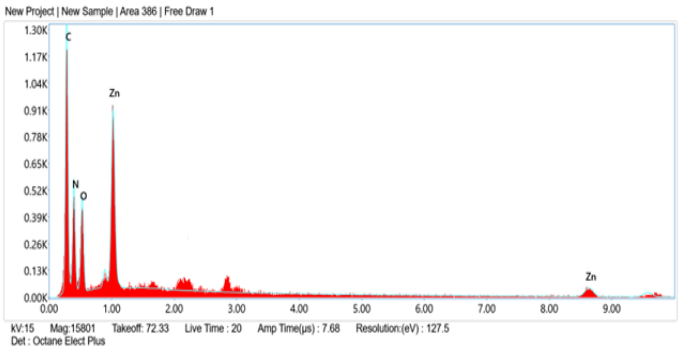
Table S1. Aggregate size of the systems investigated through DLS.

Aggregates	Size D_h(nm)	PDI
C_{12}EMorphBr	17.00 ± 2	0.02 ± 0.01
NaDC/C_{12}EMorphBr (7mM)	168.2 ± 10	0.23 ± 0.05
DOX-NaDC/C_{12}EMorphBr	170.1 ± 10	0.31 ± 0.05



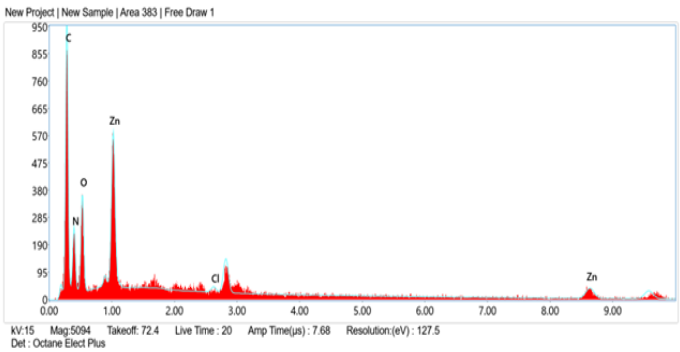
(a) **(b)**

Figure S5. TEM images of **(a)** NaDC/C_{12}EMorphBr and **(b)** DOX-loaded NaDC/C_{12}EMorphBr@ZIF-8 nanocomposite.



Element	Weight %	Net Int.
C K	47.66	338.41
N K	26.95	130.54
O K	15.17	126.49
Zn K	10.22	35.11

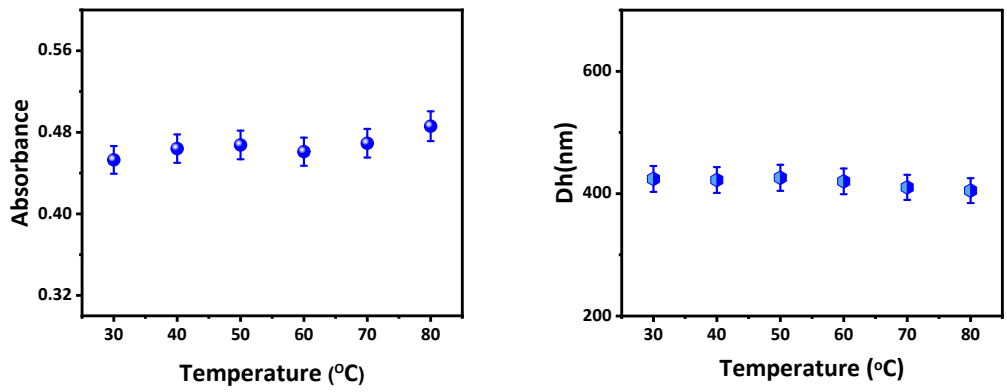
(a)



Element	Weight %	Net Int.
C K	52.80	230.76
N K	18.77	54.28
O K	15.48	92.23
Cl K	0.33	9.04
Zn K	12.61	28.92

(b)

Figure S6. EDS graph of **(a)** neat ZIF-8 **(b)** DOX- loaded NaDC/C_{12}EMorphBr@ZIF-8 nanocomposites.



(a) (b)

Figure S7 Stability of the NaDC/C_{12}EMorphBr vesicular nano-aggregates as a function of temperature through **(a)** Turbidity and **(b)** Absorbance measurement.

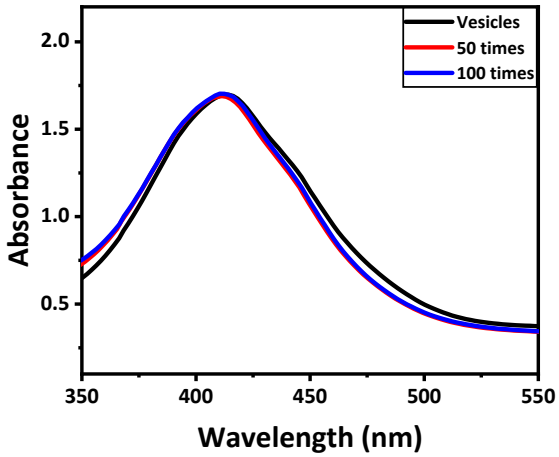
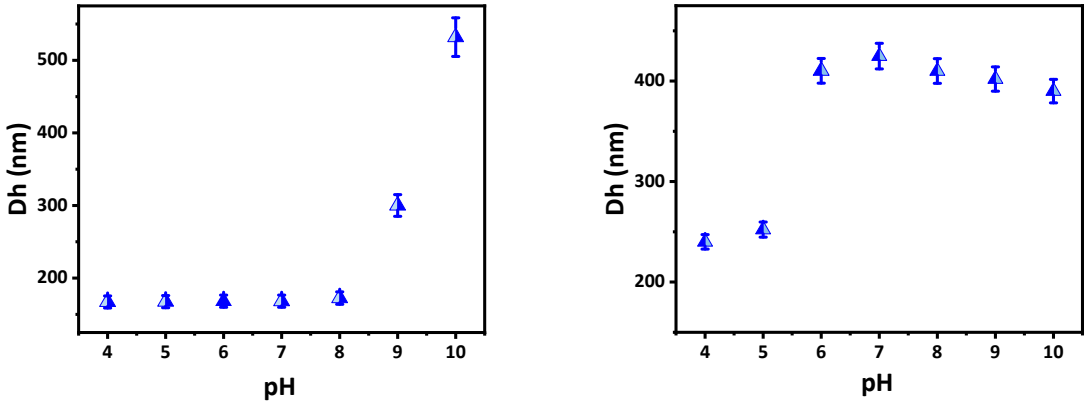


Figure S8. Stability of the NaDC/C_{12}EMorphBr vesicles as a function of dilution

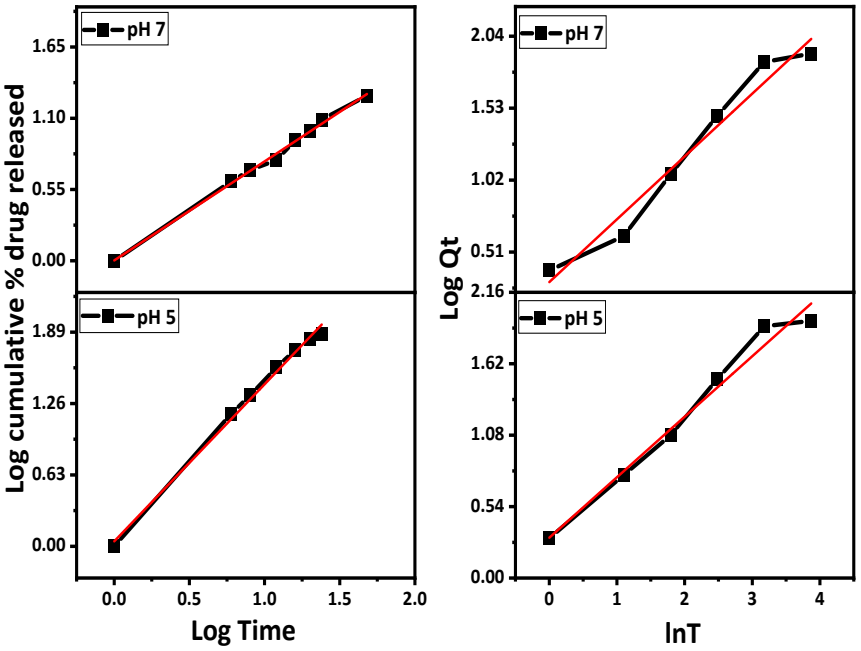


(a) (b)

Figure S9. Stability of the vesicles as a function of pH through size of nanoaggregates. **(a)** NaDC/C_{12}EMorphBr vesicles **(b)** DOX loaded NaDC/C_{12}EMorphBr@ZIF-8

Table S2. Stability of vesicles with time by DLS

Time	D_h of Vesicles (nm) (-+5 nm)	D_h of nanocomposite (nm) (-+5 nm)
1 week	168.2	424.5
2 week	169	426.2
1 month	168.9	425.1
3 month	172	426.3
6 month	169	426.1



(a) **(b)**

Figure S10. Kinetic models **(a)** Ritger peppas model fitting plot for DOX loaded NaDC/C12EMorphBr vesicle **(b)** Korsmeyer-Peppas model fitting plot for DOX loaded NaDC/C12EMorphBr@ZIF-8 nanocomposite in PBS buffer of pH 5, pH 7 environment.

Table S3. Mathematical models of mean cumulative release rate versus time of DOX loaded NaDC/C12EMorphBr vesicle and DOX loaded NaDC/C12EMorphBr@ZIF-8 nanocomposite in PBS buffer of pH 5, pH 7 environment.

Model Used	pH 5 vesicle	pH 7 vesicle	pH 5 nanocomposite	pH 7 nanocomposite

Zero-order	$Q = 2.0278t + 4.1979$ $R^2 = 0.881$	$Q = 1.8871t + 3.601$ $R^2 = 0.8964$	$Q = 1.9224t + 12.625$ $R^2 = 0.8241$	$Q = 0.3819t + 1.6899$ $R^2 = 0.9675$
First-order	$\ln Q = -0.0211t + 2.0153$ $R^2 = 0.9331$	$\ln Q = -0.0172t + 2.0098$ $R^2 = 0.9469$	$\ln Q = -0.0209t + 2.0079$ $R^2 = 0.9587$	$\ln Q = -0.0019t + 1.9936$ $R^2 = 0.9779$
Higuchi	$Q = 14.969\ t^{1/2} - 12.35$ $R^2 = 0.9062$	$Q = 13.877\ t^{1/2} - 11.643$ $R^2 = 0.9149$	$Q = 14.759t^{1/2} - 8.753$ $R^2 = 0.9039$	$Q = 2.7761\ t^{1/2} - 1.9902$ $R^2 = 0.9511$
Hixcon-Crowell	$Q^{1/3} = 0.0543t + 0.0087$ $R^2 = 0.9165$	$Q^{1/3}\ 0.0467t + 0.0103$ $R^2 = 0.9065$	$Q^{1/3} = 0.053t + 0.0966$ $R^2 = 0.9225$	$Q^{1/3} = 0.0064t + 0.0243$ $R^2 = 0.9744$
Korsmeyer-Peppas	$\ln Q = 1.21t + 0.1091$ $R^2 = 0.9725$	$\ln Q = 1.1781t + 0.1065$ $R^2 = 0.9667$	$\ln Q = 1.3859t + 0.0435$ $R^2 = 0.9943$	$\ln Q = 0.765t + 0.0013$ $R^2 = 0.9975$
Ritger-peppas	$\ln Q = 0.4573 \ln t + 0.3048$ $R^2 = 0.9788$	$\ln Q = 0.4425 \ln t + 0.2973$ $R^2 = 0.9822$	$\ln Q = 0.3125 \ln t + 0.0273$ $R^2 = 0.9122$	$\ln Q = 0.3319 \ln t + 0.0022$ $R^2 = 0.9481$

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