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NANOBOTTLES FOR ENCAPSULATION, CONTROLLED RELEASE, AND GRADUATE TRAINING

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Abstract: Bottles have existed for more than10,000 years and they are indispensable for the storage and transport of liquids and solids. The unique design of a bottle offers immediate advantages in terms of easiness and convenience for packaging, storage, and transportation. With the help of a simple cork or cap, the bottle can be utilized to hold the loaded content for a long period of time by protecting it from evaporation, decomposition, contamination, or deterioration. We are working to reduce the dimensions of bottles to the nanometer scale by developing colloidal particles with a hollow interior and small opening(s) in the wall. Their bottle-like features make them universal carriers for the encapsulation, controlled release, and delivery of all sorts of theranostic agents. The hollow interior gives them a high loading capacity while the opening(s) enables quick loading and controlled release of the payload(s). More significantly, on-demand release can be readily achieved by adding a stimuli-responsive material as the inner matrix or cork stopper. Because of its multidisciplinary nature, this research offers a natural vehicle to enrich and enhance the education and training experience of both graduate and undergraduate students.

Bio: *Younan Xia received his Ph.D. in physical chemistry from Harvard University in 1996 (with George M. Whitesides). He started as an Assistant Professor of Chemistry at the University of Washington (Seattle) in 1997 and then joined the Department of Biomedical Engineering at Washington University in St. Louis in 2007 as the James M. McKelvey Professor. Since 2012, he has held the position of Brock Family Chair and Georgia Research Alliance Eminent Scholar at Georgia Tech. He served as an Associate Editor of Nano Letters from 2002–2019.*