

ACOUSTICS2008/1717
Ultrasonic synthesis of enzyme coated microbubbles

Muthupandian Ashokkumar, Francesca Cavalieri and Franz Grieser
Department of Chemical and Biomolecular Engineering, The University of Melbourne, Parkville, Victoria,
3010 Melbourne, Australia

Gas-filled polymer coated microbubbles are intrinsically ultrasound responsive systems and when tailored with targeting features are promising candidates for smart drug delivery. We have ultrasonically synthesised stable, versatile, biodegradable and biocompatible microbubbles using the enzyme, lysozyme. The synthesis of lysozyme microbubbles has been achieved by sonicating an aqueous solution containing denatured lysozyme. The microbubbles have been characterised using a number of imaging techniques such as, SEM, AFM and light microscopy. We have observed that the experimental parameters such as, length of sonication, DTT concentration and denaturation time deeply affect the yield and the size of the microbubbles. We have also investigated the secondary structure and the enzymatic activity of lysozyme coated microbubbles. The lysozyme microbubbles have retained their enzymatic antimicrobial activities.