higher for the scaffolds containing 2.0 wt% CuO. Treating the scaffolds with bone morphogenetic health proteins −2 (1 μg/defect) significantly increased the bone infiltration and reduced the fibrous tissue in the scaffolds. Cu concentrations of 0.4 and 0.8 wt% exhibited no significant adverse influence on the quantity and alkaline phosphatase activity of MC3T3-E1 skin cells cultured on the scaffolds, bone regeneration, and angiogenesis in rats after 6 weeks of implantation (Brown et al., 2009).

5.6 DRUG DELIVERY

The treatment for the postoperative microorganism infections generally require long term medication. Methicillin-resistant *Staphylococcus aureus* (MRSA) has become the foremost common osteomyelitis-inducing source. Treatment of such microorganism infections commonly involves removal of damaged tissue at the side of the infection followed by antibiotic medical care. Even after thorough surgical operation, residual infection typically remains within the bone. The operation conjointly creates a bone defect that sometimes needs later reconstruction. Long-term blood vessel treatment of the infection leads to high concentrations of antibiotics within the blood, which might cause general toxicity and development of microorganism resistance against typical antibiotics. A scientific approach to combat this example would be to fill the cavity ensuing from surgical operation with a biomaterial loaded with antibiotic followed by the general administration of the drug if and when needed. Elution of the drug from the glass can proceed by one or more combinations of processes: surface release, diffusion, and release via newly generated cracks formed during the resorption process. The microorganism infection in orthopedic surgery can be devastating and results in severe morbidity (Norden et al., 1980). Medications taken orally or intravenously treat the whole body, whereas the drug embedded in a biomaterial locally treats the wound, hence reducing the probabilities of the patient becoming addicted to the drug due to taking an unnecessarily high dosage of the drug.

Borate bioactive glasses are attracting the attention of researchers due to their superior ability to be converted completely to HA than the silicate bioactive glasses, such as 45S5 and S53P4. However, the use of borate glasses as a drug carrier is scarcely studied.

Borate bioactive glass begins to degrades almost immediately when placed in an aqueous solution containing PO_4^{3-} ions; the degradation process involves release of boron and the glass network modifiers such as Na^+ and K^+ ions into the solution. The Ca^{2+} ions released from the surface of the glass react with the phosphate ions from the solution to form amorphous calcium phosphate (ACP) or HA-like material on the surface of the glass. The conversion of the glass to ACP or HA results in a weight loss, which along with the concentration of boron released into the solution can be used to study the degradation of borate bioactive glass and its suitability as a drug carrying biomaterial (Huang et al., 2006a,b).