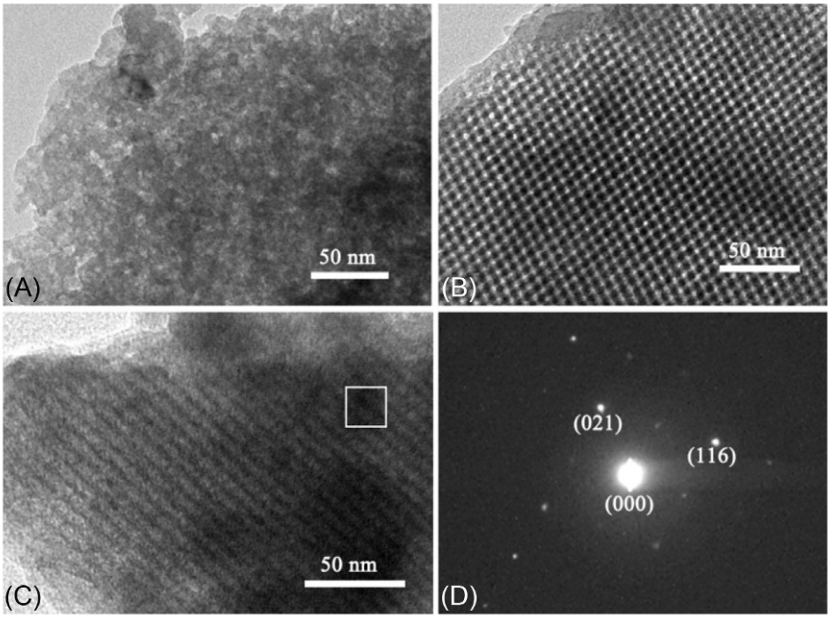

FIG. 4.6 TEM images of the samples: (A) NBG, (B) MBG, (C) MMBG, and (D) the corresponding SAED of box in (C) (Liu et al., 2014).

the selected region (Fig. 4.6D) (Liu et al., 2014). As compared with pure MBGs, the magnetic nanoparticles in the MMBG not only improve the sustained drug-release property, but also provide the magnetic property. For the gentamicin-loaded MMBG, the sustained release of gentamicin and the magnetic property minimize bacterial adhesion significantly and prevent biofilm formation against *S. aureus* and *S. epidermidis*. Moreover, the magnetic nanoparticles in the MMBG can promote crucial cell functions such as cell adhesion, spreading, and proliferation (Liu et al., 2014). The MMBG particles as drug delivery carriers possess the ability to target desired organs or tissues selectively inside the human body under an external magnetic field (Li et al., 2008a).

4.3.3 Drug-Loaded MBGs for Enhanced Bone Regeneration

MGB particles, coatings, fibers, and scaffolds have been widely used for bone regeneration because of their excellent biocompatibility, biodegradability, and osteoconductivity (El-Fiqi et al., 2015). However, the limited osteoinductivity of MBGs may cause poor bone-forming activity in vivo, which holds back their clinical application in orthopedic surgery (El-Fiqi et al., 2015). Fortunately, the above problems can be addressed by using MBGs as carriers for loading osteogenic drugs or growth factors such as DEX, VEGF, PDGF, and BMP-2 (El-Fiqi et al., 2015; Zhang et al., 2013; Schumacher et al., 2017; Wu and Chang, 2014).