encapsulate molecules and, in mixture with other biopolymers, modulate the degradation rate. The mechanical properties, for example adhesion strength of the coatings to the substrate, showed an increase with PVA content. Qualitative bending tests led to the formation of some microcracks and to detached areas on the edges of the coatings. However detachment of the coating was only reached after 5 bending cycles. This behavior was explained by considering the dominant structure of the polymer leading to enhanced bonding to the substrate and high flexibility of the composite coating. Under excessive bending, tensile and shearing forces are involved. The bioactive behavior of the system was influenced by the presence of PVA. A higher PVA content retarded the decomposition rate of the coating in SBF, but the bioactivity itself was not affected. After 2 days of immersion in SBF, HA was found on the surface of the coatings.

Besides constant voltage EPD, alternating current (AC) EPD can be applied. Seuss et al. (2014) deposited 45S5 BG particles in different size ranges together with chitosan on stainless steel and Ti scaffolds. For this EPD mode, besides voltage and time, the frequency also has to be considered. With this method, 3D porous scaffolds could be coated not only from the outside, but also the interior of the porous structure was properly coated with chitosan-BG layers. Another example of alternating current EPD can be found in the study of Chen et al. (2013). They worked with a rectangular wave and an asymmetric ratio of 7:3. It was found that a less porous coating was formed, which exhibited higher contact angle compared to coatings produced by DC-EPD.

The use of particles as binders in composite coatings has been considered in order to gain systems with multiple applications and properties. Cordero-Arias et al. (2015) introduced ZnO particles into alginate/BG coatings in order to enhance antibacterial properties. The addition of ZnO particles resulted in a reduction of the bacterial colony (*Escherichia coli*) after 1 h. The antibacterial activity of ZnO particles is due to the generation of hydrogen peroxide and possibly through the binding of the ZnO particles to the cells via electrostatic forces, damaging the cell membrane and killing the bacteria. Hydroxyapatite as a binder was applied by Molaei et al. (2015) to create nanocomposites with chitosan (CS) and BGs. The deposition mechanism of CS-BG-HA coating included the self-assembly of hydroxyapatite nanoparticles that are chelated by cationic macromolecular chains and joined with BG microparticles. CS-coated HA nanoparticles formed in the suspension and then deposited on the substrates under the influence of the applied voltage. Electrochemical behavior in SBF revealed that the coating increased the corrosion resistance of the substrate. According to the impedance results in Fig. 1.7, the nanocomposite acts as a protective layer. This behavior could be due to the presence of BG particles and the formation of relatively thick coatings (Molaei et al., 2015). Zhitomirsky et al. (2009) developed a similar system of composites with nanoparticles of HA. Cationic chitosan and anionic alginate were used to provide electrosteric stabilization to the charged BG and HA particles in order to promote the deposition. The mechanism of deposition of the chitosan composite is based on the increase