To improve corrosion resistance and electronic conductivity of bipolar plates for proton exchange membrane fuel cells (PEMFC), coatings of TiNb and TiNbN on 316L stainless steel (SS) were prepared by magnetron sputtering. X-ray diffraction measurements confirmed the existence of metallic nitrides in the TiNbN coating. Scanning electron microscope tests showed that the deposited coatings provided smooth surfaces. Further electrochemical measurements indicated that the corrosion resistance of the TiNb coating was significantly higher than that of the substrate. At 0.19 V vs MSE, the long-term stabilized current density of TiNb/316L SS was lower than 1 μA·cm⁻². The interfacial contact resistance values between coating and carbon paper suggested that TiNb and TiNbN films had better contact conductivity than the 316L SS substrate. In conclusion, TiNb coated 316L SS metallic bipolar plate material is a promising option for PEMFC.