

A B S T R A C T

There is provided an impregnated-type cathode substrate comprising a large particle diameter low porosity region and a small particle diameter high porosity region which is provided in a side of an electron emission surface of the large particle diameter low porosity region and has an average particle diameter smaller than an average particle diameter of the large particle diameter low pore region and a porosity higher than a porosity of the large particle diameter low porosity region, the impregnated-type cathode being impregnated with an electron emission substance.