ABSTRACT

ELECTRON BEAM RESIST UNDERLAYER FILM-FORMING COMPOSITION CONTAINING LACTONE-STRUCTURE-CONTAINING POLYMER

There is provided a resist underlayer film for electron beam lithography that can reduce adverse effects caused by a base substrate and electron beams, and form an excellent resist pattern having a straight shape. An electron beam resist underlayer film-forming composition comprising a polymer containing a unit structure having a lactone ring and a unit structure having a hydroxy group. The polymer may be a polymer obtained by copolymerizing a monomer mixture containing a lactone (meth)acrylate, a hydroxyalkyl (meth)acrylate, and phenyl (meth)acrylate or benzyl (meth)acrylate. A method for producing a semiconductor device comprising: applying the electron beam resist underlayer film-forming composition onto a substrate and heating the applied composition to form an electron beam resist underlayer film; coating the electron beam resist underlayer film with an electron beam resist; irradiating the substrate coated with the electron beam resist underlayer film and the electron beam resist with an electron beam; developing the substrate; and transferring an image onto the substrate by dry etching to form an integrated circuit element.

FIG.1