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ABSTRACT

An ion implantation apparatus includes an ion source for extracting ions therefrom at an extraction voltage, an acceleration pipe for accelerating the ions thus extracted at an acceleration voltage of V_A and a momentum segregation magnet for selecting the ions having a specific momentum from the ions extracted from the acceleration pipe so that the desired ions are caused to be incident on a target. Assuming that M_I denotes the mass number of the desired ions, Z_I denotes the valence thereof, M_C denotes the mass number of noted impurity ions of the impurity ions generated an upstream side of the acceleration pipe, and Z_C denotes the valence thereof, if the relationship that the value of $M_I \cdot (V_E + V_A) / Z_I$ and that of $M_C \cdot V_A / Z_C$ are equal or approximately equal to each other is satisfied, one of the extraction voltage V_E and the acceleration voltage V_A is increased and the other thereof is decreased while the value of $(V_E + V_A)$ is maintained substantially constant.