more, it is more preferable that all material names listed in said collation process are displayed together with the number of times they were listed (or proportion (%) of listed times to the total number of times) on the screen of the CRT **10** as shown in FIG. **13**(*b*).

After identifying the specimen material at step F, the computer **4** reads out the relation between the d-values and Miller indices from the crystal database stored in the external memory means **7**, and refers to the relation so as to determine the Miller indices of each d-value. Furthermore, the computer **4** calculates the reciprocal lattice vector on the basis of the Miller indices of each d-value, and determines the orientation of the specimen on the basis of the reciprocal lattic vector.

Having thus described the invention with the details and particularity required by the Patent Laws, what is desired protected by Letters Patent is set forth in the following claims.

I claim:

1. Method for automatic analysis of an electron beam diffraction pattern obtained by a transmission type electron microscope comprising:

(a) a step for capturing said electron beam diffraction pattern as a two dimensional array of digitized intensity values, each element in the array having a value Uxy;

(b) a step for building a frequency distribution of intensity values from said two dimensional array;

(c) a step for deciding whether said diffraction pattern is composed of only diffraction spots, only diffraction rings, or both diffraction spots and rings, on the basis of said frequency distribution of intensity values;

(d) a step for accumulating lattice spacing d-values corresponding to each diffraction spot or ring appearing in said diffraction pattern from the two dimensional array by an algorithm selected on the basis of the result of said step (c); and

(e) a step for determining the specimen material corresponding to said electron diffraction pattern by collating said lattice spacing d-values determining in step (d) with the d-values of the various materials in a crystal database.

2. Method for automatic analysis of electron diffraction pattern according to claim **1**, wherein said step (c) comprising:

(c-1) a step for calculating the weighted average $\bar{I}$ indicated by the following equation of

$$\bar{I}=\{\ H(I)\cdot I\}/\{\ H(I)\},$$

(c-2) a step for calculating the value δ indicated by the following equation of

$$\delta=\ H(I)\cdot(I-\bar{I})^2, \text{ and}$$

(c-3) a step for deciding whether said diffraction pattern is composed of only diffraction spots, only diffraction rings, or both diffraction spots and rings, by comparing the value δ with two reference values.

3. Method for automatic analysis of electron diffraction pattern according to claim **1**, wherein said step (d) comprises in the case of a determination in step (c) that the diffraction pattern is composed of only diffraction spots

(d-11) a step for classifying each Uxy into a black or white level,

(d-12) a step for determining the coordinate (u, v) of the center spot corresponding to the group having the most number of the white level pixels,

(d-13) a step for determining the center coordinate (u, v) of each group of white level pixels,

(d-14) a step for calculating the distance "Rs" between said center coordinate (u, v) of each group of white level pixels, and

(d-15) a step for calculating the lattice spacing d-values "Ds" corresponding to the calculated distance "Rs".

4. Method for automatic analysis of electron diffraction pattern according to claim **1**, wherein said step (d) comprises in the case of a determination in step (c) that the diffraction pattern is composed of only diffraction rings.

(d-21) a step for calculating the X-axis projection of Uxy and Y-axis projection of Uxy,

(d-22) a step for determining the coordinate (u_o, v_o) of the center spot of the diffraction pattern by detecting the coordinates (u_o) and (v_o) at the maximum values of said X- and Y-axis projections,

(d-23) a step for determining the coordinate (u, v) of each pixel having peak value on the passing through the center coordinate of said center spot;

(d-24) a step for calculating the radius "Rr" between the center coordinate of the center spot and said each coordinate (u, v), and

(d-25) a step for calculating the lattice spacing d-values "Dr" corresponding to the calculated radius "Rr".

5. Method for automatic analysis of electron diffraction pattern according to claim **1**, wherein said step (d) comprises in the case of a determination in step (c) that the diffraction pattern is composed of both diffraction spots and diffraction rings

(d-31) a step for calculating the X-axis projection of Uxy and Y-axis projection of Uxy.

(d-32) a step for determining the coordinate (u_o, v_o) of the center sport of the diffraction pattern by detecting the coordinate (u_o) and (v_o) at the maximum value of said Y-axis projection,

(d-33) a step for classifying each Uxy into black or white level,

(d-34) a step for determining the center coordinate (u, v) of each group of white level pixels,

(d-35) a step for deciding on a diffraction spot or diffraction ring for each group of white level pixels, and

(d-36) a step for calculating the lattic spacing d-values corresponding to each group of white level pixels on the basis of the results in step (d-35).

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