

## HR-HAADF technique of single crystalline GaAs

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High Angular annular dark field (HAADF) imaging in STEM mode is able to provide structural and chemical information at atomic resolution. By this technique we have chemical and spatial characterization of the structure. The efficiency of this technique can provide direct imaging of the lattice along several projections; however, the limit spatial resolution depends directly of the size beam [1].

Using a HAADF detector we are able to observe the projection of single column of atoms [2]. HAADF images have an intensity profile proportional to the square of the atomic number ( $\alpha Z^2$ ), where  $\alpha$  depends only on the imaging conditions [2,3]. In the present work, we analyzed the spatial resolution of a HAADF detector using a spot size of 0.2 nm in a JEM 2010 FasTem microscope of the binary semiconductor GaAs. The study was performed to observe the family planes {110} which lattice parameter is 2.8 Å and {111} with a lattice parameter of 2 Å.

In conclusion, a single HAADF image allows us to deduce fractional composition for each atom independently. If we are able to know the dispersion factor, the unit cell and the thickness of the sample, we can determinate by using HAADF contrast imaging the atomic proportion of each chemical specie in each column given us a real chemical atomic resolution.

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[3] Kirkland A.I. and Saxton W.O. *Journal of Microscopy* **206** (2002) 1-6.