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Micro-RDS to explore the spatial strain distribution in epitaxial AlN layers CHUNHUA WANG, ZHIYU YANG, ZHIQIANG YAO, WENJUN ZHANG, DEPARTMENT OF PHYSICS, HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY TEAM, DEPARTMENT OF PHYSICS AND MATERIALS SCIENCE, CITY UNIVERSITY OF HONG KONG TEAM — A non-destructive method to observe the spatially resolved strain distribution in the sub-micrometer scale has been developed. By using micro-RDS to obtain the RA distribution on AlN films grown on Si and sapphire substrates, combining with the relation of the strain and optical anisotropy, we reveal the local strain distribution in the sub-micrometer scale. Strain domains several micrometers in size have been observed in AlN films grown epitaxially on Si without the amorphous interface layer. Each domain consists of hundreds of AlN grains. In films with many defects or grown on sapphire substrate there are no domains of dominant sizes, and the average strain is about 6 times smaller than the ones without the interface layer. The magnitude of the strain agrees well with the experimental values from the established methods such as XRD, TEM and Raman scattering.

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