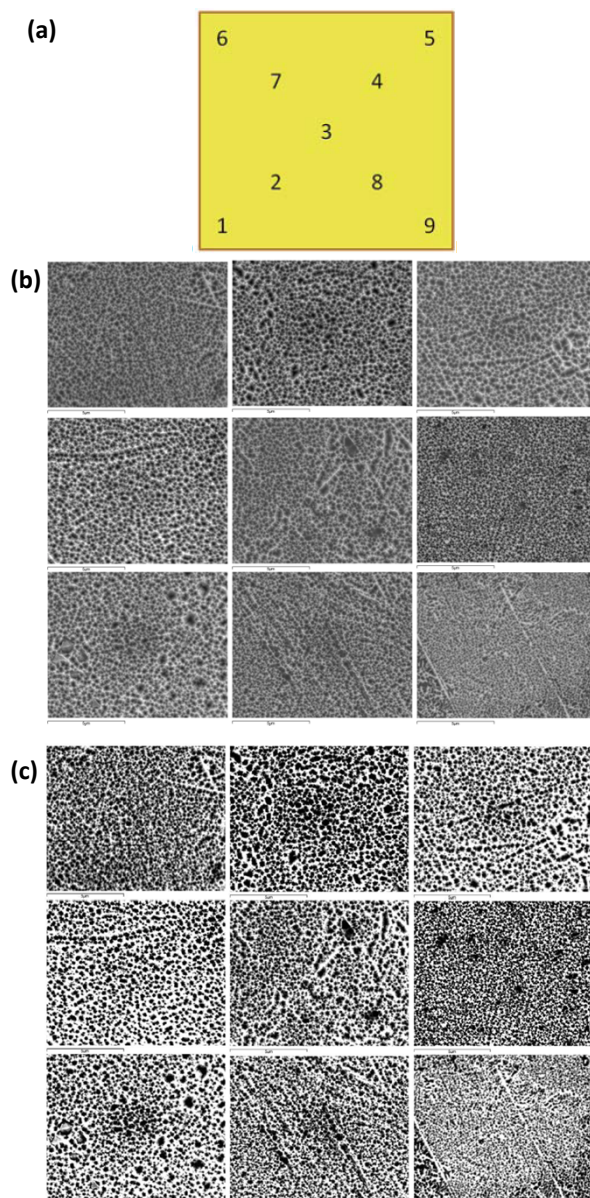


### Determination of the porosity degree

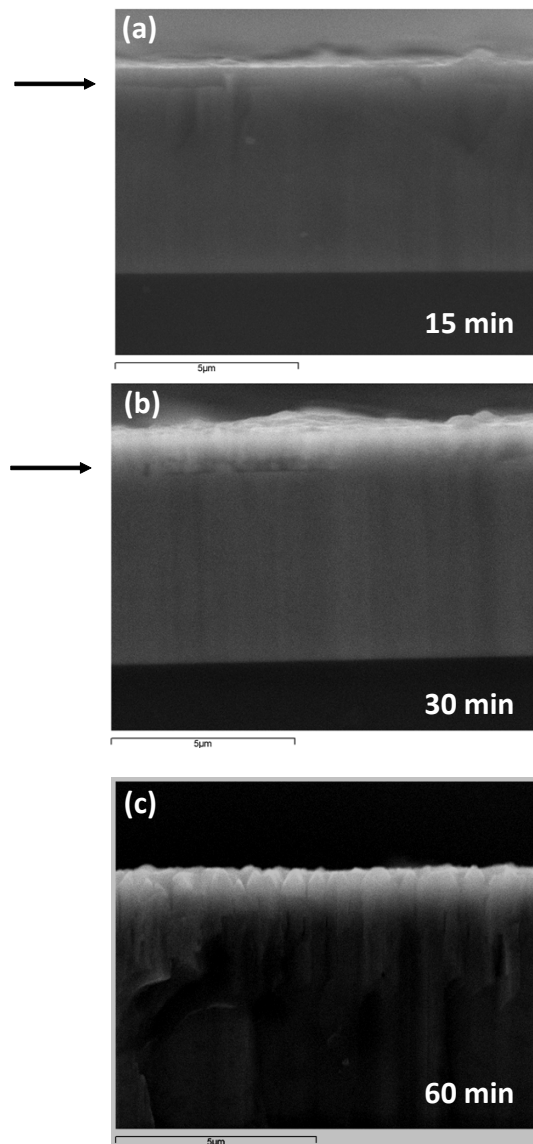
For the determination of the distribution of porosity on the different samples we recorded 9 SEM top-view images, each of them representative of a part of the sample (see Figure S2(a)), and with the help of the GIMP 2 software we filtered the images to evaluate the percentage of porosity by counting the number of black and white pixels in the image, as can be seen in Figures S2(b) and (c). Black pixels correspond to pores, while white pixels correspond to GaN. Then, we averaged the results obtained for each sample, which gave us an idea of the degree of porosity of each sample.



**Figure S2.** (a) Scheme of the collection of SEM top-view images in each sample to determine the degree of porosity. (b) SEM top-view images collected for the porous GaN epitaxial layer grown for 30 minutes. (c) SEM images filtered by the GIMP 2 software showing the image only on black and white that the utility used to count the pixels of each color.

### Determination of the thickness of the epitaxial layer

The thickness of the epitaxial layer was determined from cross-section SEM pictures of each sample. Figure S1 shows enlarged views of the cross-section images used to determine the thickness of the porous layers as a function of the deposition time. As can be seen in the images, for the epitaxial layers grown during 15 and 30 minutes there is a horizontal gap that separates the porous layer from the non-porous substrate that we used to determine the thickness of the porous layers (see Figures S1(a) and (b)). To facilitate the vision of this gap, we marked it with an arrow next to the images. Also in the case of the epitaxial layer grown for 30 minutes, a different color can be observed for the epitaxial layer and the substrate. In the case of the epitaxial layer grown during 60 minutes, we could not observe this gap, although we could observe again a different color for the porous layer in contrast with the non-porous substrate that we used to determine the thickness of the porous layers (see Figure S1(c)). This change of color is likely due to the different density of the material due to the presence of the pores, caused by a variable refractive index characteristics of graded index (GRIN) layers in many materials.



**Figure S1.** Cross-section images of the porous GaN epitaxial layers grown for (a) 15 min, (b) 30 min and (c) 60 min. The bar size is in all cases 5 μm.