Electronic Supplementary Material (ESI) for CrystEngComm.
This journal is © The Royal Society of Chemistry 2017

Electronic supplementary information

Nearly perfect GaN crystal via pit-assisted growth by HVPE

Moonsang Lee,[a] Dmitry Mikulik,[b] Mino Yang,[c] and Sungsoo Park[d,e*]

[a] Korea Basic Science Institute, 162 Yeongudanjiro, Ochang, Cheongju, Chungbuk 28119, Republic of Korea

[b]Laboratory of Semiconductor Materials, Ecole Polytechnique Fédérale de Lausanne 1015, Lausanne, Switzerland

[c] Seoul center, Korea Basic Science Institute, Anam-dong 5-ga, Seongbuk-gu, Seoul 136-713, Republic of Korea

[d]Department of Science Education, Jeonju University, 303 Cheonjam-ro, Wansan-gu, Jeollabuk-do, Republic of Korea

[e]Analytical Lab. of Advanced Ferroelectric Crystals, Jeonju University, 303 Cheonjam-ro, Wansan-gu, Jeollabuk-do, Repub-lic of Korea

Corresponding Author:*sspark@jj.ac.kr

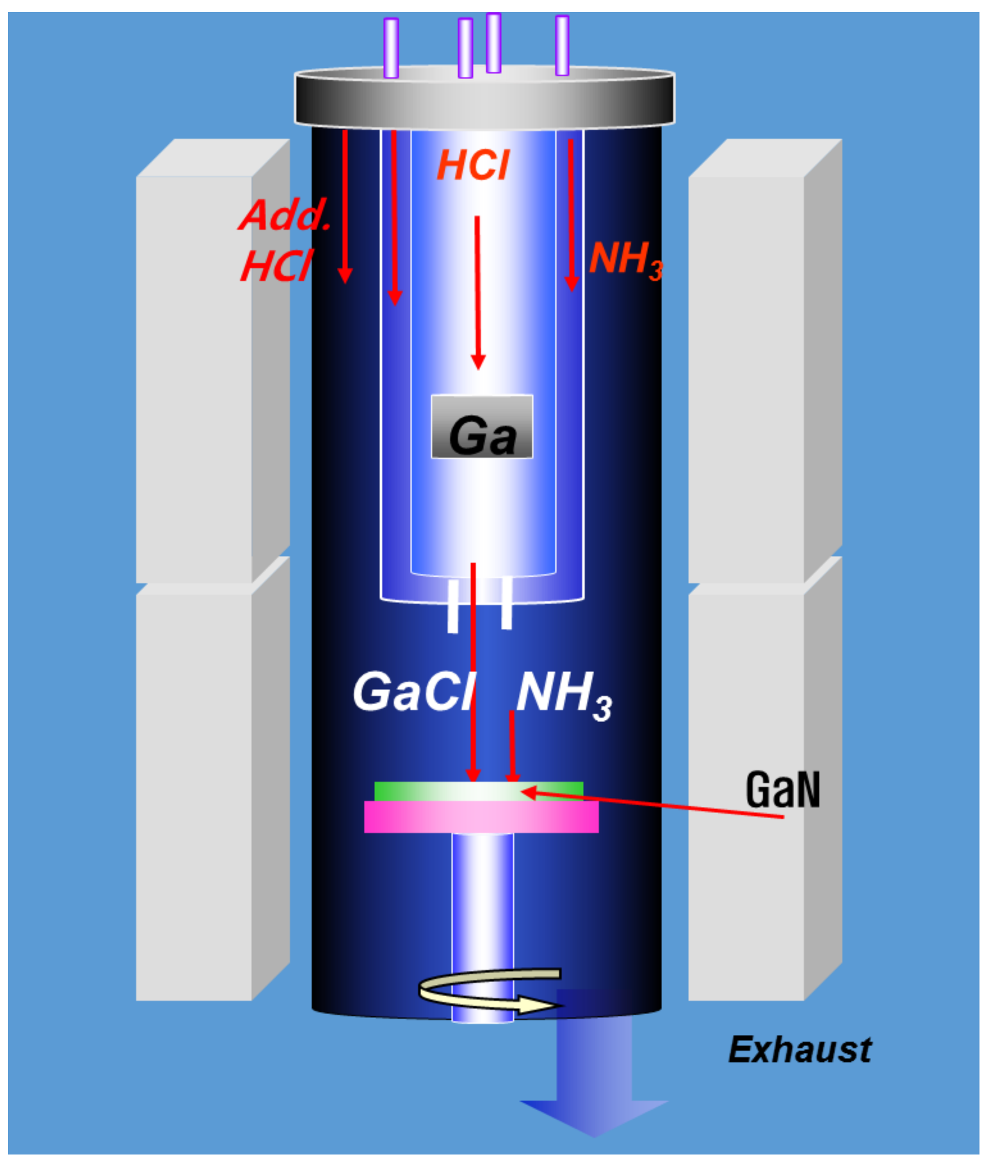
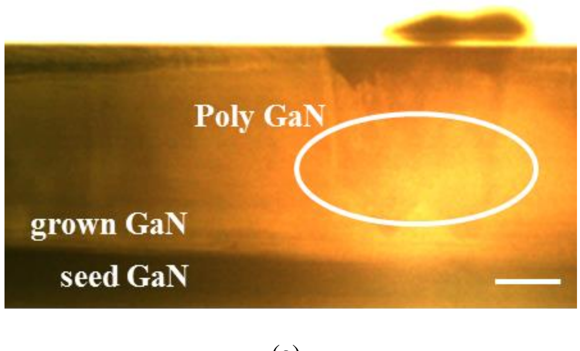


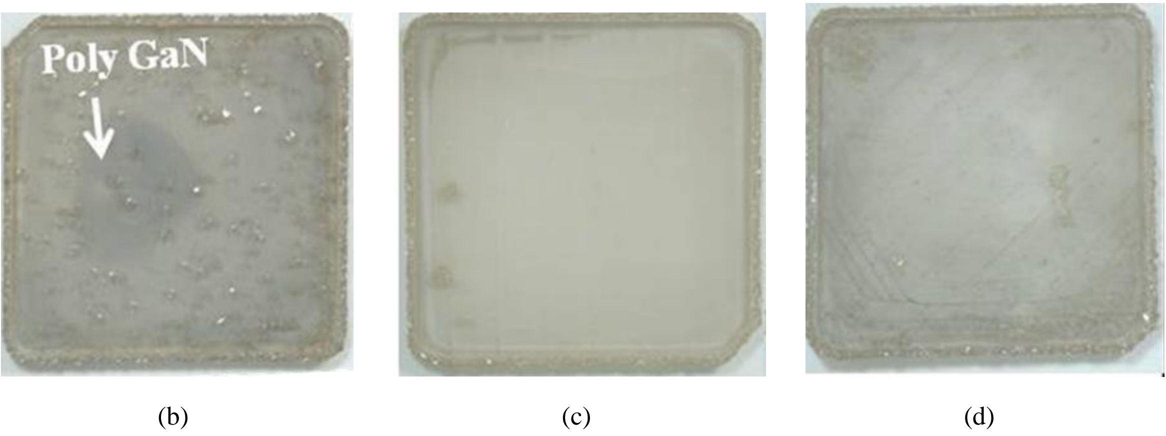
Fig. S1 Schematic diagram of home-made vertical-type hot wall HVPE reactor

HCl etching time (min)	HCl (1000 ℃, 300 sccm)	HCl → H_3PO_4 (160 ℃, 5 min)	HCl → H_3PO_4 (160 ℃, 15 min)
5			
10			
20			

Fig. S2 Optical microscopy images of surface of the freestanding GaN as a function of HCl etching time, and H_3PO_4 etching time



(a)



(b) (c) (d)

Fig. S3 (a) Cross sectional stereo microscopy image of bulk GaN crystal with 2 mm in thickness. The scale bar is 500 µm. Surface images of bulk GaN grown with additional HCl flow rate of (b) 0 sccm, (c) 40 sccm, and (d) 100 sccm. The size of bulk GaN is 10 mm x 10 mm.