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Electronic Supplementary Information for

The Influence of Fermi Level Position at the GaN Surface on Carrier Transfer across the $MAPbI_3$/GaN Interface

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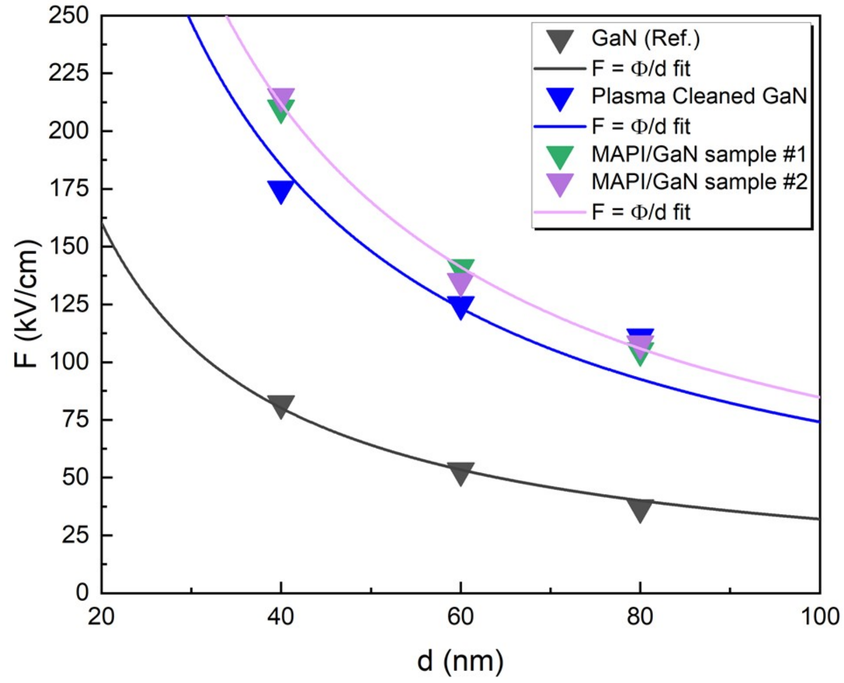
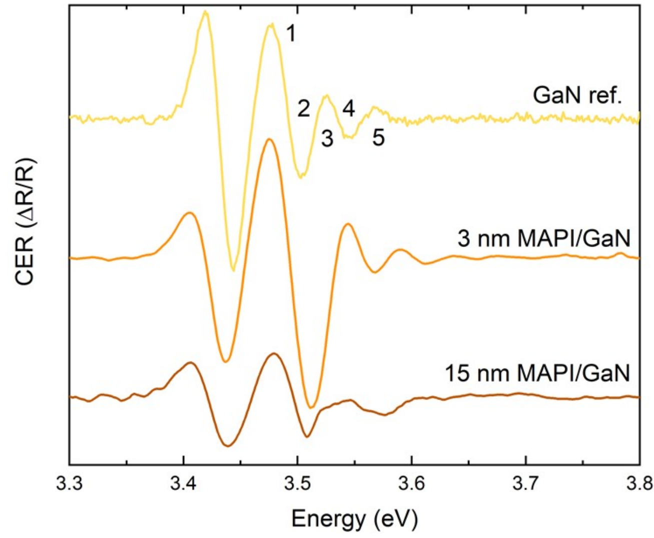


Figure 1 Determination of surface barrier height for uncleaned reference GaN vH, plasma cleaned and two samples of $MAPbI_3$ covered GaN.

Sample	Φ (eV)
GaN (Ref.)	0.32 ± 0.01
Plasma cleaned GaN	0.74 ± 0.05
$MAPbI_3$ /GaN	0.85 ± 0.02

Table 1 Surface barrier determined from fitting procedure shown in Figure S1.

Prior to $MAPbI_3$ deposition vH GaN substrates were plasma cleaned in order to remove organic residues. The influence of such treatment on Fermi level pinning on GaN surface was investigated for n-type GaN vH set of samples. Figure 1 presents values of built-in electric fields obtained for measured samples (uncleaned GaN as a reference, plasma cleaned and two samples of $MAPbI_3$ covered GaN). Values of surface barrier heights obtained from fitting of built-in electric fields with Eq. 4 (main part of the article) are presented in Table 1. For plasma cleaned GaN surface higher barrier is observed compared to the reference. After $MAPbI_3$ deposition further increase was found.



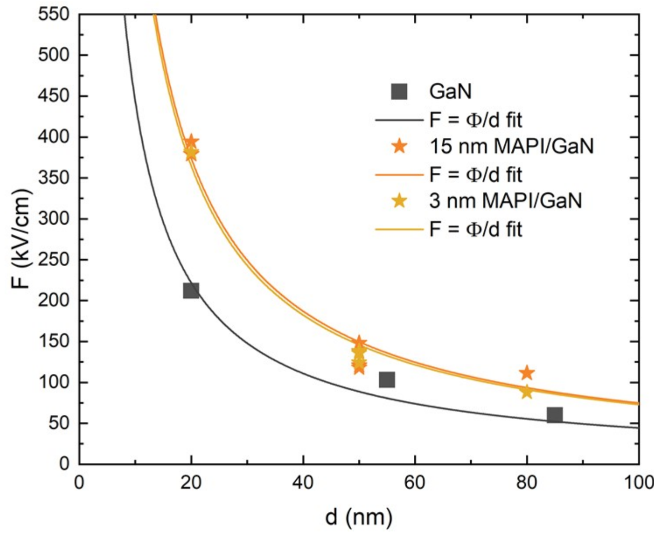


Figure 2 Upper panel: CER spectra of exemplary samples sunder study. Lower panel: determination of surface barrier for reference vH GaN and set of MAPI/GaN structures with 3 and 15 nm thick MAPI films.

Sample	Φ (eV)
GaN (Ref.)	0.44 ± 0.03
3 nm $MAPbI_3$/GaN	0.73 ± 0.02
15 nm $MAPbI_3$ /GaN	0.75 ± 0.03

Table 2 Surface barriers obtained for reference GaN vH and 3 nm and 15 nm MAPI/GaN samples.

In order to verify whether observed MAPI-induced increase of surface barrier height at MAPI/GaN interface depends on MAPI film thickness, set of samples containing reference GaN and several samples with 3 and 15 nm thick MAPI films were checked. Upper panel of Figure 2 shows exemplary CER spectra of each sample. Lower panel of Figure 2 shows the fitting procedure for investigated set of samples. As can be noticed, values of built-in electric fields obtained for vH covered with 3 and 15 nm thick MAPI films are in line with each other. This indicates MAPI thickness independent barrier for electrons at MAPI/GaN interface. Table 2 summarizes extracted values of surface barriers.