1. energy separation （energy difference）between the quantum dot (QD) ground and first-excited states 能量间隔
2. Analysis by Transmission Electron Microscopy (TEM) has identified 分析
3. Whilst同时
4. Stacking Fault s (SF) and threading dislocations (TD) are often associated with the large lattice mismatch in most III – V semiconductor films.与…有关
5. the GaAs barrier layer was divided in two parts分割
6. a characteristic v-shape gliding有…特征
7. The presence of these SFs is observed to create surface QDs被认为是
8. Areas区域
9. extending to延伸至
10. In contrast to与…对比
11. we would suggest this could be related to我们认为
12. dislocations occurring at the microscopic level 出现在
13. migrate away from迁移开
14. spectral response 光谱响应
15. in terms of根据，与…有关
16. composition，content组分
17. attracting strong interest引起兴趣
18. aspects such as许多方面例如
19. As previously reported正如以前报道的
20. The emission wavelength of the QDs red-shifted by 300 nm红移了300nm
21. As the composition is increased, there is an increase in density and size随着…增加什么增加
22. the reduction of PL intensity for larger compositions occurs as a result of threading dislocations being formed
23. suppressed by压制，抑制
24. epilayer外延层
25. variation变化
26. interrupted growth method间断生长
27. ion (Ar+) laser with 514.53 nm氩离子激光波长
28. it can be seen that从…可以看出
29. reveal a strong quantum localization effect展示
30. Such a blue shift in EL wavelength could be attributed to the band-filling effect of localized energy states蓝移，归咎于，能带填充效应
31. A blueshift of 3 and 1.7 cm−1 蓝移
32. Incorporating结合
33. 1.3–1.6mm has been achieved for InAs/GaAs QDs by实现
34. are limited by性能局限于
35. received little attention to date现在已经没人关注
36. spacer layer隔离层
37. the initial 15 nm of the GaAs SPL was deposited at 5101C, following which the temperature was increased to 580 1 C for the remainder of the GaAs SPL随后
38. thermal escape热逃逸
39. QD ensembles量子点群
40. the value of E E值
41. are dramatically reduced巨大的
42. takes place发生，出现
43. QD PL band caused by PL图，引起
44. are taken into account考虑
45. active region活性区
46. vertical strain coupling 垂直耦合
47. sample c shows the highest value (75 meV) followed by sample b with 60 meV and sample d with 56 meV排序
48. is crucial for对…至关重要
49. zero-dimensional structures零维结构
50. involving涉及
51. cap layer盖层
52. With an increase in the excitation power (20 mW to 100 mW) there is an increase in the contribution related to the excited state of sample
53. one in which there are two ‘‘families’’ of QDs with different average sizes，一个…
54. the thermal escape will produce a red-shift of P2 emission band产生红移
55. an order of magnitude lower少一个数量级
56. Such phenomena support the hypothesis that我们认为
57. made up of a sum of contributions of什么的相互作用
58. With increasing temperature, there may be a transfer of carriers from larger to smaller QDs随着…增加
59. A set of samples一系列
60. epitaxy on (1 0 0) oriented外延在…100面
61. As one can see that 可以看出
62. PL spectra were fitted with a Gaussian profile拟合
63. The smaller Stokes-type shift combining with the narrow PL linewidth suggests that两原因结合说明了什么
64. is located at能级位于
65. one can find that可以看出
66. charge carriers载流子
67. discrete energy level 离散能级
68. is strongly dependent on取决于
69. ten-layer stack 10叠层
70. a new class of一新类别
71. enable tailoring of the detection wavelength能够对探测波长进行裁剪
72. bias dependence of the responsivity响应率随偏压变化
73. escape routes逃逸路线
74. dual-color双色
75. final states in the surrounding matrix终态
76. a bias tunable energy separation 偏压可调的能级间隔
77. energy intervals能级间隔
78. is assigned to指定为
79. In–Ga intermixing 互混
80. lateral size横向尺寸
81. The volume of each QD is defined as hA/2 with A the area and h the height 定义什么为什么
82. capping layer盖层
83. be of great potential for有很大潜力
84. three dimensional carrier confinement of the QD三维限制效应 3D confinement
85. interaction between相互作用
86. suffer from 承受 sustain
87. spreads out to 传播到
88. The insert shows插图说明
89. the increase of the quantum efficiency overcomes the increased dark current超过
90. pushed the response peak toward 推向
91. wavefunction coupling波长耦合
92. When positively biased当正偏压时
93. artificial atom-like人工类原子
94. hybrid 混合
95. wavelength tuning波长调制
96. significant impact on有重要影响
97. (i.e. QDs) 例如
98. Top left panel shows左上图说明了
99. photo-excited carriers 光生载流子
100. be compensated in part by部分
101. mesas台面
102. blackbody source黑体源
103. be coupled to被耦合到
104. reflection grating反射光栅
105. photolithographic techniques光印刷技术
106. Indium-bump铟柱
107. bias range from…to范围
108. multi-spectral response多光谱响应
109. spectral tuning光谱调制
110. adjacent to临近
111. the tailoring of detection wavelength 探测波长裁剪
112. have an additional advantage of优势
113. elevates抬高
114. the splitting of the single detection peak 探测峰的劈裂
115. In principle原则上
116. blocking layer 阻挡层
117. Additionally=in addition
118. Relax selection rule选择定则
119. phonon bottleneck effect声子瓶颈效应
120. Systematic study of 系统研究了
121. Full width half maximum of the spectral response 半高宽
122. are of interest for several applications 有兴趣
123. outperform the ones in the market胜过
124. completed a detailed investigation of研究了
125. bias-tunability电压调制性
126. Some solutions to mitigate these problems 解决问题
127. limited the manufacturing yield of large area focal-plane arrays 量产
128. carrier relaxation-times载流子弛豫时间
129. the intricate dependence of the operating wavelength on the size and shape of the dot后者依赖于前者
130. random self-assembly process随机自组装过程
131. Apart from除什么之外
132. is estimated to估计为
133. average spacing 平均距离
134. lateral coupling 横向耦合
135. a factor of 10 十分之一
136. Low temperature photocurrent peaks observed at 120 and 148 meV were identified as 指认为
137. intersubband transitions emanating from 来自于
138. night vision 夜视
139. The 3D confinement will give rise to 产生
140. the number of allowed dark current transitions 跃迁数
141. give rise to a photocurrent 产生光电流
142. a detailed understanding of all relevant transitions occurring in the detector is not yet gained 还没有很好的解决
143. optical pumping光学泵浦
144. is shown to be 认为是
145. provide the flexibility to adjust the electronic states 调节的灵活性
146. 60 Å in height and 220 Å in radius
147. Repulsive相反的
148. strain-compensated应变补偿
149. impurities incorporated during the growth杂质掺杂
150. sensitive layers活性层，敏感层
151. in the 25 – 400°C interval在…区间间隔
152. Silver contacts proved to be ohmic through current – voltage measurements欧姆接触
153. rectifying behavior 整流特性
154. no systematic investigation was carried out on responsivity versus temperature 执行系统的研究
155. in dark conditions 在暗条件下
156. cut on and cut off wavelengths 截止波长
157. exhibited photoresponse peaking at 3.5 um波长在多少
158. The operation principle of 工作原理
159. nominal Ge deposition thickness名义厚度
160. One obvious feature is that 可以看出
161. is consistent with 与…一致
162. with a main peak at around 3.5 um主峰
163. the hole absorption of photons 光子的空穴吸收
164. are utilized to用于
165. night vision, and optical communication etc.(有点)等等
166. are particularly worthy of academic investigation 值得，学术研究
167. polarization selection rule 偏振选择定则
168. this Si-based detector has the advantage of the monolithic integration with the read-out circuit与硅读出电路集成
169. cut down the dark current降低暗电流
170. added delta dope 德尔塔掺杂
171. the vertical alignment 垂直耦合
172. We report the 摘要
173. intensity ratio of 强度比
174. was accompanied by 伴随着
175. during the last decade 近十年来
176. delta-function-like density delta函数
177. two-dimensional array 二维阵列
178. misfit dislocation nucleation 位错成核
179. were ascribed to 归咎于
180. This shift could be associated with phonon confinement 与…联系起来
181. phonon replicas 声子峰
182. structure with h = 40 nm with的用法
183. the broad shape of the PL peak suggests a large inhomogeneity of the islands’ size distribution 物表明
184. It is worth mentioning that值得一提的是
185. induce the QD energy redshift 红移
186. attributed to a type-II band alignment II型能带
187. cannot be 不能，not是连着的
188. This blueshift can be explained in terms of a type-II band lineup 蓝移， 以…有关
189. the holes are trapped in the Ge islands 位于
190. increased confinement增强的限制
191. holes in the wetting layer could be transferred to the islands转移
192. One can note that 可以看出
193. good optical quality 好的光学性质
194. interdiffusion processes 互扩散
195. spatially ordered arrays 空间有序阵列
196. in-plane ordering of the islands 平面有序
197. monolayer单原子层
198. the island base 量子点基底
199. The islands are oriented along directions close to [010] and朝向
200. the net volume of 净体积
201. exceed 超过
202. vibration band 震动峰
203. transition point 变化点
204. The dependences of hc on the thickness dSiGe is investigated临界厚度依赖于SiGe厚度
205. Ge segregation 偏析
206. provides the best agreement between the calculated and experimental data 相符合
207. a part of 一部分
208. relying on obtained results, it can be assumed that 从得到的结果…可以看出
209. spatial ordering 空间有序
210. interdiffusion processes 扩散过程
211. increase in Ge content leads to Ge含量的增加
212. noticeably显著的
213. mass transfer from质量迁移
214. the quantity of material diffused into the islands is equivalent to 6.4 nm 等于
215. is associated with 归咎于
216. island self-ordering 自有序
217. Another possible reason for 另一个可能的问题
218. we attribute to 我们认为
219. dominant absorption bands peaked主要吸收峰
220. We tentatively propose that我们暂时提出
221. the electrons are free in the Si conduction band 电子是自由的
222. P-polarized absorptions 偏振吸收
223. quantum efficiency of about 0.015% of的用法
224. wavelength range of 范围
225. relax the momentum conservation requirement 缓解动量守恒
226. still far from ideal 远不如
227. current of 7 mA速流7mA
228. in tapping (contect) mode 轻巧或接触模式
229. 3 nm tall 3nm高
230. By contrast作为对比
231. are consistent with与…有关
232. first-order optical mode一介光学模式
233. vibrational peaks振动峰
234. the downward shift of the Ge–Ge peak to 299 cm−1红移
235. Within the frame of 在…框架下
236. irrespective of不考虑
237. contact angle接触角
238. The interest is mainly driven by 兴趣
239. type-II band alignment II型能带排列
240. degrade the qualities降低质量
241. loading into the vacuum chamber装入腔体
242. be decomposed into two Gaussian shape peaks 分解为
243. shows strong blueshifts 蓝移
244. is believed to be相信是
245. Coulomb charging effect库伦电荷效应
246. are accompanied by 伴随着
247. give detailed insights into 详细的了解
248. relies on 依赖于
249. a change in shape in的写法
250. are indicative for 指认为
251. It is noticeable that值得注意的是
252. The ratio of domes to huts 比例的用法
253. Is by a factor of two smaller than几分之几
254. is in consistence with有关
255. It is established that得出
256. A feature of particular interest is 特别感兴趣的是
257. AFM were used to characterize 用来表征
258. is in fact detrimental to 对…有害，不利
259. at the expense of以…为代价
260. penetrates through贯穿
261. defect-free无缺陷的
262. Owing to 由于
263. more uniform in size in+名词，在…方面
264. optical phonon frequencies 光学声子频率
265. it is an indicator on关于什么的指示
266. perform=carry out 执行
267. phonon assisted recombination声子辅助复合
268. increasing tendency for 趋势
269. heteroepitaxial Ge/Si systems系统
270. optic-phonon modes光学振动模
271. were investigated by a combination of Raman scatter spectra and photoluminescence. 结合
272. is considered as；is correlating with认为是
273. The intensities of the Ge–Ge peak IGe-Ge and the Ge–Si peak IGe-Si are found to be reliable to determine 可靠的
274. shows a good fit to our experimental results相符
275. with respect to 相对于…
276. tentatively attributed to暂时的
277. intensive studies 大量研究
278. we mainly deal with this issue by investigating处理
279. A redshift of PL spectra is observed after annealing at temperature below 780 °C, whereas annealing above this temperature induces a blueshift. 然而
280. PL signal recorded for Ge/Si cluster single layer指认为
281. we attempt to interpret these results within a simple thermodynamic model 尝试解释,在..框架下
282. The composition distribution of Ge islands is also of importance重要
283. most methods used in addressing the composition of Ge islands探究
284. provides the trigger to使…开始启动
285. ring-like structure环状结构
286. The first term第一个式子
287. Note that here值得注意的是
288. transport characteristics of特性
289. Estimates show that测试表明
290. there has been a surge of interest in 大量的
291. in-plane confinement横向限制
292. as a result of breaking of the polarization selection rules偏振选择定则
293. zero-dimensional character of the electronic spectrum零维
294. render 展现
295. There are only few works announcing the long-wave operation 报道
296. was sandwiched in between sth and sth夹在
297. high sheet density 高密度
298. the top portion of顶部
299. were in good agreement with一致
300. pose a long-standing puzzle 提出问题
301. A rich body of subsequent work大量的
302. two key aspects came to light 重要方面
303. in view of 考虑到
304. The amount of the strain大量的，修饰不可数
305. with reference to 关于
306. The height and the base of the dots range from 8 to 15 nm and from 140 to 200 nm, respectively, upon increasing the thickness of Si spacer from 14 to 100 nm/ upon increasing the thickness up to一旦…
307. a strain field superposition of buried dots应变场的交叠
308. were explained in terms of two possible contributions 关于
309. a strained Si0.65Ge0.35quantum well, which, in turn, is incorporated in a Si matrix包含在
310. the polarization dependence of the induced PC后面依赖于前面
311. elucidate the nature of photoresponse 阐明….的本质
312. normal incidence infrared radiation 正入射红外辐射
313. Ge QDs enclosed in a silicon matrix 包含在
314. We suspect that 我们认为
315. As stated before 如前面所述
316. Lorentzian decomposition of the spectra 分峰
317. This edge is tilted 带边倾斜
318. The value of the barrier height U0 derived from P2 depends on the effective mass 依赖于
319. energy difference between
320. a new class of 一类
321. It appears that Ge/Si quantum dots could combine the advantages of quantum dots as compared to quantum wells while keeping the compatibility with Si-based signal processing. 看起来，结合
322. opens the route to the realization of 实现
323. the photoluminescence spectrum is dominated by the radiative recombination associated with the Ge dots. 占据
324. The measurement is performed测试
325. transverse-optical phonon-assisted recombination横向光学声子辅助复合
326. along with伴随着
327. is similar for A and B相似的
328. the 160 meV resonance is quenched消失
329. the temperature dependence on the electric power依赖于
330. be decomposed into two components分成
331. The samples are here after referred to as Ge300, Ge600, and Ge1500, respectively.在之后的文章表示为
332. Then, a 10 nm thick Si1xGexlayer with x ranging from 0% to 20% was grown, followed by a Ge layer
333. Since 因为
334. The additional flux of atoms流
335. In order to test this assumption为了证明这种假设
336. Ge is deposited on a Si0.8Ge0.2 alloy沉积用被动
337. could be invoked to explain用来解释
338. elastic strain energy stored in the predeposited Si1-xGex layer应变存储
339. Fig. 2 displays显示
340. Sth reveal that揭示了
341. It is very important to know非常重要
342. Another attractive object另一个有趣的是
343. However，is not clarified yet还没解决
344. were chosen in such a way as to avoid在这种条件下 in such a way that
345. , and then,随后
346. reaches a stationary value缓和
347. provides the best agreement between一致
348. it also increases Si content in islands and, as a results, increase the critical volume 结果
349. We are making emphasis on强调
350. as it was noticed above如上所述
351. Increase in deposited Ge nominal thickness from 9 to 11 ML leads to增加什么，导致
352. the average island height makes 37.2 nm make可以当is用
353. the ratio of island heights versus their lateral sizes 比
354. Special attention in this work is paid to注重
355. in connection with与..有关
356. We consider the doublet band behavior in sample B as related with 我们认为、有关
357. We performed sth我们执行什么
358. Both these facts give reasons to consider this band as related with 可以解释，有关
359. Islands grow；The islands were formed by 量子点生长
360. The island coarsening量子点的粗化
361. The intermixing between Si and Ge dominated at higher temperatures 占据主导地位
362. pyramids and domes appeared to coexist in a stable configuration
363. However, the growth and evolution of islands prepared by IBSD has not been studied adequately还没人研究
364. 密度大用greater
365. clustering to form集聚形成
366. approximately 60% of the islands were less than the aspect ratio of 0.1主语颠倒
367. This is an implication that表明
368. The short islands could grow up if the amount of Ge increased长大
369. Subsequently随后
370. occurs via a combination of发生，结合
371. ，whereby sth do sth 通过上述这种方法
372. statistical analysis of island size统计
373. displays=show= operates=take over 显示了
374. In succeeding sections=In what follows， 在下文中
375. We quantify this observation, identify the coarsening mechanisms 认为
376. Sth contributes significantly to
377. Are being fed by this reservoir of Ge atoms 水库，浸润层，提供
378. Is evident in the appearance of证据
379. is indicative of Ostwald ripening指示是熟化
380. islands may communicate more effectively via surface diffusion at higher growth temperatures 量子点扩散，交流
381. a variety of recipes for不同的方法
382. coalescence合并
383. remarkable observations显著的观察
384. Intermixing of sth with sth
385. larger particles grow at the expense of smaller particles代价
386. ，yielding sth 产生
387. obeys the same relationship遵循
388. delay the onset of 开始
389. virtually=mostly大部分
390. transform to/form
391. a larger fraction of 大部分
392. substantial numbers of大量的
393. often coincide with有关，由于
394. Further insight can be gained by considering进一步考虑
395. appear to似乎
396. is likely to有可能
397. to our knowledge众所周知
398. present a possible scenario for方法
399. undergo a morphological transition to承受
400. understood on grounds of依据什么
401. the growth topology of生长量子点图
402. reached a level, where达到最大值
403. It is noteworthy at this point that值得注意的是
404. The island size is dominated by the balance of 由于
405. , suggesting that
406. gain insight into
407. island populations量子点群
408. dependence of total cluster volume as a function of Ge indicates that依赖于
409. Samples spanning the Ge coverage range from5.0<Ge<14.0 ML were grown在什么范围
410. careful cataloging of the shape evolution of these islands as a function of growth conditions has not yet been performed 内容还没有解决
411. were used to document
412. coherent=dislocation-free
413. present a detailed catalog of
414. cross-sectional line scans横截面
415. we are able to map island evolution for different growth temperatures阐明，阐述
416. At the left-hand side of this cluster 左手边
417. It is well known that众所周知
418. presenting a detailed analysis and discussion of阐述了
419. in the time interval of 30–45 min between the formation of two successive dislocations 间隔
420. Si atom has been transported into the island迁移
421. （see later）请看下文
422. thorough investigation of全面的研究
423. The authors apply selective wet chemical etching 采用
424. evolves toward an intriguing semifacetted structure演变成
425. an understanding of the capping process is of fundamental importance重要的
426. The effect is temperature dependent温度依赖的
427. the height scales高度尺寸
428. presumably because 大致归咎于
429. misfit strain位错应变
430. ，which in turn affects转过来影响
431. coincides with伴随着
432. corresponding=related
433. were characterized by atomic force microscopy表征
434. The left column of Fig. 1左边一排
435. Demonstrating/indicating that
436. is mainly responsible for归咎于
437. building blocks for future electronic or optoelectronic devices 奠定基石
438. remains still a matter of controversy/was not yet clearly identified/was not investigated in detail.还没解决
439. strain induced triggering诱导的没有一杠
440. temperature was ramped down/up温度降低、身高
441. Standing from the viewpoint of the simulation
442. Fig后面接的词A detailed investigation shows that；We find out that；It should be noted that；We can see that；In contrast with Ge islands grown on Si, we observe；It is revealed that；It was found out that
443. a record speed of 12 GHz 记录速率
444. possess high mobility 拥有
445. In comparison to 比较
446. zoom-in view of缩放图
447. KEEN attention has been drawn to the study 注意
448. These extraordinary features 非凡的
449. transfer yield is>99% 专业率
450. Overall=From the aforementioned analysis总的来说
451. the flexible Ge diode indicates a much lower turn-on voltage than Si diode, validating 证明了
452. Very recently，最近
453. with combined high and low temperature high and low processes 结合
454. As of today 截至今天
455. a handful of reports show 少量的
456. The TFT denoted as TFT-2 indicated as(也是定义的意思) negative values定义
457. is elaborated below 叙述
458. is of great interest 感兴趣
459. the implanted side of Ge was in contact with glass substrate 连接在一起
460. strengthen the chemical bonds 强化
461. may be an alternative to 选择
462. visible light可见光
463. process flow工艺流程
464. generating sth生产
465. The prospect is to integrate期望
466. irregular shape不寻常的
467. single-crystal Ge is yet to demonstrate 因此
468. performance tradeoff性能折衷
469. Theoretical calculations have also been conducted执行
470. The capacitance is dependent on the series diode width and metal stack thickness依赖于
471. To make a fair comparison比较
472. Can have better RF properties拥有
473. not presented here due to the length limit of this Letter
474. make them superb candidates for 候选
475. A considerable number of大量的
476. critical dimensions极限尺寸
477. Of more importance重要的是
478. bulk wafer counterparts对等物
479. lightly doped亲掺杂
480. Vicat softening point of PET substrates is 170°C
481. stripping off剥离
482. firmly contacted with牢固地
483. theoretical analysis has been conducted执行
484. In essence本质上
485. Tiny/substantial changes小大变化
486. innate limitation固有的本质的
487. Figure 1 schematically illustrates
488. de-convoluted using the Gaussian/Lorentzian function去复杂化
489. photodetector under shining of 633 nm light照射
490. Figure 4 plots画出了
491. magnified image 放大图
492. As expected如预期的
493. is speculated to be推导出

时态用法

摘要：一般现在时

引言：一般现在时，别人说用过去式，

1. 别人发现什么it was found that sth done sth

2. it indicates that说的内容用一般现在时

3. 对于现在我们做的it is found that sth do sth

4. study, investigation等要用过去式的被动was studied, was carried out，was observed,也可以用现在完成时，现在完成时和过去完成时区别只是起点不一样，一个是以现在为起点，一个以过去为起点。

5. 陈述一种事实用一般现在时（可有引用文献）

6. 涉及到figure这种词一般用现在时

实验：过去式

结果与讨论：一般用现在时，如果有人为因素，如我们做了什么事情，要用过去式，因为是过去做的。涉及实验部分也要用过去式。

结论：the experimental investigations revealed/It was shown that/It was revealed experimentally that后面加一般现在时陈述你之前得出的结果

7. 注意点：当用到用什么设备测试时用过去时，当关于我们以前做了什么,执行什么动作时用过去式，但是如we believe，we find，we can see that，we observe观测到什么结果，这些词可不用过去式。可用could/would be done sth，讲到其他文献时用过去式

1. 不可数名词一般不加the，要特指才加the，具体化，但是如the realization of是固定用法，realization是不可数，
2. 复数可以不加the，
3. 中文里的这个，那个，某特定的，能指出来的就加，你都不清楚指不出的不加。
4. 表示抽象意义、概念的不可数名词和复数不加the
5. 组合词看特指没特指,没特指不加the,如deposited on Si substrate，deposited on the Si substrate