# 验证报告(Verification Report)

**报告编号(Report No.)：WTH20H11090516C-1** 日期(Date)：2020/12/4 页数(Page)：1 of 10

委托单位： 郑州比克电池有限公司
Applicant: Zhengzhou BAK Battery CO.,LTD
单位地址： 河南省郑州市中牟县郑庵镇刘巧村委
Address: LiuQiao Village Zheng An town Zhongmou county Zhengzhou city Henan P.R.China

**样品信息(Sample Information)：**
样品名称(Sample Name)： Cylindrical Lithium-ion Rechargeable Cell
样品描述(Sample Description)： 请参见后续页(Please refer to following page(s))。
样品型号(Sample Model)： N18650CL-29-2900mAh
委托日期(Sample Received Date)： 2020/11/30
检测日期(Testing Period)： 2020/11/30 - 2020/12/4

**检测结果(Test Result)：** 请参见后续页(Please refer to following page(s))。

| **检测要求(Test Requested)：** | **结论(Conclusion)** |
|---|---|
| 根据客户要求，参照欧盟 RoHS 指令 2011/65/EU 及其修订指令 EU 2015/863，对样品中的铅(Pb)、镉(Cd)、汞(Hg)、六价铬(Cr(VI))、多溴联苯(PBBs)、多溴二苯醚(PBDEs)、邻苯二甲酸二正丁酯(DBP)、邻苯二甲酸丁苄酯(BBP)、邻苯二甲酸二(2-乙基己基)酯(DEHP)、邻苯二甲酸二异丁酯(DIBP)的含量进行验证(As specified by client, to verify the Lead(Pb), Cadmium(Cd), Mercury(Hg), Hexavalent Chromium(Cr(VI)), Polybrominated Biphenyls(PBBs), Polybrominated Diphenyl Ethers(PBDEs), Dibutyl phthalate(DBP), Butylbenzyl phthalate(BBP), Di-(2-ethylhexyl) Phthalate(DEHP), Di-iso-butyl phthalate (DIBP) content in the sample with reference to EU RoHS Directive 2011/65/EU and its amendment Directive EU 2015/863.)。 | 合格(PASS) |

授权签字人
Signed for and on behalf of HCT

Michael Huang

Shenzhen Hongcai Testing Technology Co., Ltd
深圳市虹彩检测技术有限公司
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无 CMA 标识报告中的结果仅用于客户科研、教学、内部质量控制、产品研发等目的，仅供内部参考，对社会不具有证明作用。
有 CNAS 标识报告中的“ ”代表该检测项目暂未申请 CNAS 认可。The result(s) in no CMA logo report shall only be used for client's scientific research, teaching, internal quality control,product research and development, etc..and just for internal reference, does not prove to society.
The “ ” in CNAS logo report means that the test item(s) was (were) currently not applying for CNAS accreditation .

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**检测结果(Test Result(s))：**

| 序号 (No.) | 样品描述 (Sample Description) | | 检测项目 (Test Item(s)) | ED-XRF 检测结果 (ED-XRF Test Result(s)) (1) | 化学 检测结果 (Chemical Test Result(s)) (2) | 样品接收日期 (Received Sample(s) Date) | 备注 (Note) |
|---|---|---|---|---|---|---|---|
| 1 | 黑印绿色塑胶外皮 | Black printed green plastic outer wire jacket | Pb | BL | --- | 2020-11-30 | ● |
| | | | Cd | BL | --- | | |
| | | | Hg | BL | --- | | |
| | | | Cr(VI) | BL | --- | | |
| | | | PBBs | BL | --- | | |
| | | | PBDEs | BL | --- | | |
| 2 | 白色塑胶垫片 | White plastic gasket | Pb | BL | --- | 2020-11-30 | ● |
| | | | Cd | BL | --- | | |
| | | | Hg | BL | --- | | |
| | | | Cr(VI) | BL | --- | | |
| | | | PBBs | BL | --- | | |
| | | | PBDEs | BL | --- | | |
| 3 | 银色金属壳 | Silver metal shell | Pb | BL | --- | 2020-11-30 | ● |
| | | | Cd | BL | --- | | |
| | | | Hg | BL | --- | | |
| | | | Cr(VI) | BL | --- | | |
| | | | PBBs | --- | --- | | |
| | | | PBDEs | --- | --- | | |
| 4 | 蓝色塑胶片 | Blue plastic sheet | Pb | BL | --- | 2020-11-30 | ● |
| | | | Cd | BL | --- | | |
| | | | Hg | BL | --- | | |
| | | | Cr(VI) | BL | --- | | |
| | | | PBBs | BL | --- | | |
| | | | PBDEs | BL | --- | | |
| 5 | 半透明塑胶套 | Translucent plastic sleeve | Pb | BL | --- | 2020-11-30 | ● |
| | | | Cd | BL | --- | | |
| | | | Hg | BL | --- | | |

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| 序号 (No.) | 样品描述 (Sample Description) | | 检测项目 (Test Item(s)) | ED-XRF 检测结果 (ED-XRF Test Result(s)) (1) | 化学 检测结果 (Chemical Test Result(s)) (2) | 样品接收日期 (Received Sample(s) Date) | 备注 (Note) |
|---|---|---|---|---|---|---|---|
| | | | Cr(VI) | BL | --- | | |
| | | | PBBs | BL | --- | | |
| | | | PBDEs | BL | --- | | |
| 6 | 银白色金属盖 | Silver white metal cover | Pb | BL | --- | 2020-11-30 | ● |
| | | | Cd | BL | --- | | |
| | | | Hg | BL | --- | | |
| | | | Cr(VI) | BL | --- | | |
| | | | PBBs | --- | --- | | |
| | | | PBDEs | --- | --- | | |
| 7 | 银白色金属片 | Silver white metal sheet | Pb | BL | --- | 2020-11-30 | ● |
| | | | Cd | BL | --- | | |
| | | | Hg | BL | --- | | |
| | | | Cr(VI) | BL | --- | | |
| | | | PBBs | --- | --- | | |
| | | | PBDEs | --- | --- | | |
| 8 | 半透明白色塑胶环 | Translucent white plastic ring | Pb | BL | --- | 2020-11-30 | ● |
| | | | Cd | BL | --- | | |
| | | | Hg | BL | --- | | |
| | | | Cr(VI) | BL | --- | | |
| | | | PBBs | BL | --- | | |
| | | | PBDEs | BL | --- | | |
| 9 | 银色金属盖 | Silver metal cover | Pb | BL | --- | 2020-11-30 | ● |
| | | | Cd | BL | --- | | |
| | | | Hg | BL | --- | | |
| | | | Cr(VI) | BL | --- | | |
| | | | PBBs | --- | --- | | |
| | | | PBDEs | --- | --- | | |
| 10 | 银色金属片 | Silver metal sheet | Pb | BL | --- | 2020-11-30 | ● |
| | | | Cd | BL | --- | | |

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| 序号 (No.) | 样品描述 (Sample Description) | | 检测项目 (Test Item(s)) | ED-XRF 检测结果 (ED-XRF Test Result(s)) (1) | 化学 检测结果 (Chemical Test Result(s)) (2) | 样品接收日期 (Received Sample(s) Date) | 备注 (Note) |
|---|---|---|---|---|---|---|---|
| | | | Hg | BL | --- | | |
| | | | Cr(VI) | BL | --- | | |
| | | | PBBs | --- | --- | | |
| | | | PBDEs | --- | --- | | |
| 11 | 黑色塑胶垫片 | Black plastic gasket | Pb | BL | --- | 2020-11-30 | ● |
| | | | Cd | BL | --- | | |
| | | | Hg | BL | --- | | |
| | | | Cr(VI) | BL | --- | | |
| | | | PBBs | BL | --- | | |
| | | | PBDEs | BL | --- | | |
| 12 | 透明绿色胶带 | Transparent green adhesive tape | Pb | BL | --- | 2020-11-30 | ● |
| | | | Cd | BL | --- | | |
| | | | Hg | BL | --- | | |
| | | | Cr(VI) | BL | --- | | |
| | | | PBBs | BL | --- | | |
| | | | PBDEs | BL | --- | | |
| 13 | 白色塑胶膜 | White plastic film | Pb | BL | --- | 2020-11-30 | ● |
| | | | Cd | BL | --- | | |
| | | | Hg | BL | --- | | |
| | | | Cr(VI) | BL | --- | | |
| | | | PBBs | BL | --- | | |
| | | | PBDEs | BL | --- | | |
| 14 | 铜色金属箔连黑色物质 | Copper color metal foil with black substance | Pb | BL | --- | 2020-11-30 | ● |
| | | | Cd | BL | --- | | |
| | | | Hg | BL | --- | | |
| | | | Cr(VI) | BL | --- | | |
| | | | PBBs | BL | --- | | |
| | | | PBDEs | BL | --- | | |
| 15 | 银色金属箔连 | Silver metal | Pb | BL | --- | 2020-11-30 | ● |

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| 序号 (No.) | 样品描述 (Sample Description) | | 检测项目 (Test Item(s)) | ED-XRF 检测结果 (ED-XRF Test Result(s)) (1) | 化学 检测结果 (Chemical Test Result(s)) (2) | 样品接收日期 (Received Sample(s) Date) | 备注 (Note) |
|---|---|---|---|---|---|---|---|
| | 黑色物质 | foil with black material | Cd | BL | --- | | |
| | | | Hg | BL | --- | | |
| | | | Cr(VI) | BL | --- | | |
| | | | PBBs | BL | --- | | |
| | | | PBDEs | BL | --- | | |
| 16 | 透明胶带 | Transparent adhesive tape | Pb | BL | --- | 2020-11-30 | ● |
| | | | Cd | BL | --- | | |
| | | | Hg | BL | --- | | |
| | | | Cr(VI) | BL | --- | | |
| | | | PBBs | BL | --- | | |
| | | | PBDEs | BL | --- | | |
| 17 | 透明棕色胶带 | Transparent brown adhesive tape | Pb | BL | --- | 2020-11-30 | ● |
| | | | Cd | BL | --- | | |
| | | | Hg | BL | --- | | |
| | | | Cr(VI) | BL | --- | | |
| | | | PBBs | BL | --- | | |
| | | | PBDEs | BL | --- | | |
| 18 | 铜色/银色金属正电极片 | Copper/silver metal positive electrode sheet | Pb | BL | --- | 2020-11-30 | ● |
| | | | Cd | BL | --- | | |
| | | | Hg | BL | --- | | |
| | | | Cr(VI) | BL | --- | | |
| | | | PBBs | --- | --- | | |
| | | | PBDEs | --- | --- | | |
| 19 | 银色金属负电极片 | Silver metal negative electrode sheet | Pb | BL | --- | 2020-11-30 | ● |
| | | | Cd | BL | --- | | |
| | | | Hg | BL | --- | | |
| | | | Cr(VI) | BL | --- | | |
| | | | PBBs | --- | --- | | |
| | | | PBDEs | --- | --- | | |

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| 序号 (No.) | 样品描述 (Sample Description) | | 检测项目 (Test Item(s)) | PHTH 筛分结果 (PHTH Screening Test Result(s)) (1) | 化学 检测结果 (Chemical Test Result(s)) (2) | 样品接收日期 (Received Sample(s) Date) | 备注 (Note) |
|---|---|---|---|---|---|---|---|
| 1 | 黑印绿色塑胶外皮 | Black printed green plastic outer wire jacket | DBP | BL | --- | 2020-11-30 | ● |
| | | | BBP | BL | --- | | |
| | | | DEHP | BL | --- | | |
| | | | DIBP | BL | --- | | |
| 2 | 白色塑胶垫片 | White plastic gasket | DBP | BL | --- | 2020-11-30 | ● |
| | | | BBP | BL | --- | | |
| | | | DEHP | BL | --- | | |
| | | | DIBP | BL | --- | | |
| 4 | 蓝色塑胶片 | Blue plastic sheet | DBP | BL | --- | 2020-11-30 | ● |
| | | | BBP | BL | --- | | |
| | | | DEHP | BL | --- | | |
| | | | DIBP | BL | --- | | |
| 5 | 半透明塑胶套 | Translucent plastic sleeve | DBP | BL | --- | 2020-11-30 | ● |
| | | | BBP | BL | --- | | |
| | | | DEHP | BL | --- | | |
| | | | DIBP | BL | --- | | |
| 8 | 半透明白色塑胶环 | Translucent white plastic ring | DBP | BL | --- | 2020-11-30 | ● |
| | | | BBP | BL | --- | | |
| | | | DEHP | BL | --- | | |
| | | | DIBP | BL | --- | | |
| 11 | 黑色塑胶垫片 | Black plastic gasket | DBP | BL | --- | 2020-11-30 | ● |
| | | | BBP | BL | --- | | |
| | | | DEHP | BL | --- | | |
| | | | DIBP | BL | --- | | |
| 12 | 透明绿色胶带 | Transparent green adhesive tape | DBP | BL | --- | 2020-11-30 | ● |
| | | | BBP | BL | --- | | |
| | | | DEHP | BL | --- | | |

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| 序号 (No.) | 样品描述 (Sample Description) | | 检测项目 (Test Item(s)) | PHTH 筛分结果 (PHTH Screening Test Result(s)) (1) | 化学 检测结果 (Chemical Test Result(s)) (2) | 样品接收日期 (Received Sample(s) Date) | 备注 (Note) |
|---|---|---|---|---|---|---|---|
| | | | DIBP | BL | --- | | |
| 13 | 白色塑胶膜 | White plastic film | DBP | BL | --- | 2020-11-30 | ● |
| | | | BBP | BL | --- | | |
| | | | DEHP | BL | --- | | |
| | | | DIBP | BL | --- | | |
| 14 | 铜色金属箔连黑色物质 | Copper color metal foil with black substance | DBP | BL | --- | 2020-11-30 | ● |
| | | | BBP | BL | --- | | |
| | | | DEHP | BL | --- | | |
| | | | DIBP | BL | --- | | |
| 15 | 银色金属箔连黑色物质 | Silver metal foil with black material | DBP | BL | --- | 2020-11-30 | ● |
| | | | BBP | BL | --- | | |
| | | | DEHP | BL | --- | | |
| | | | DIBP | BL | --- | | |
| 16 | 透明胶带 | Transparent adhesive tape | DBP | BL | --- | 2020-11-30 | ● |
| | | | BBP | BL | --- | | |
| | | | DEHP | BL | --- | | |
| | | | DIBP | BL | --- | | |
| 17 | 透明棕色胶带 | Transparent brown adhesive tape | DBP | BL | --- | 2020-11-30 | ● |
| | | | BBP | BL | --- | | |
| | | | DEHP | BL | --- | | |
| | | | DIBP | BL | --- | | |

**备注(Note)：**

●=实际检测样品(Actual tested sample)

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**说明(Remark)：**

(1)：ED-XRF 检测(ED-XRF test)：

(a) 对于限用物质 PBBs/PBDEs，ED-XRF 结果显示的是总 Br 含量；对于限用物质 Cr(VI)，ED-XRF 结果显示的是总 Cr 含量(For the restricted substances PBBs/PBDEs, the ED-XRF results show the total Br content; for the restricted substance Cr(VI), the ED-XRF results show the total Cr content.)。

(b) ED-XRF 所得的检测结果只作初步筛选，如果 ED-XRF 结果超出 IEC 62321-3-1:2013 所规定的警戒范围，建议客户用更精确的化学检测方法检测样品(Results were obtained by ED-XRF for primary screening, and further chemical testing are recommended to be performed, if the concentration exceeds the below warning value according to IEC 62321-3-1:2013.)。

(c) PHTH 的筛分结果只做初步筛选，如果超过下表所规定的警戒范围，我们采用更精确的化学检测方法检测样品，用 GC-MS 检测 DBP,BBP,DEHP,DIBP(Screening results of PHTH are for primary screening. and further chemical testing by GC-MS (for DBP, BBP, DEHP, DIBP) are recommended to be performed if the concentration exceeds the below warning value.)。

单位(Unit)：mg/kg

| 元素 (Elements) | 聚合物 (Polymers) | 金属 (Metals) | 复合材料 (Composite material) |
|---|---|---|---|
| Pb | BL ≤ 100 < X < 1200 ≤ OL | BL ≤ 100 < X < 1200 ≤ OL | BL ≤ 80< X < 1300 ≤ OL |
| Cd | BL ≤ 30 < X < 120≤ OL | BL ≤ 30 < X < 120≤ OL | BL ≤ 30 < X < 120≤ OL |
| Hg | BL ≤ 100 < X < 1200 ≤ OL | BL ≤ 100 < X < 1200 ≤ OL | BL ≤ 80< X < 1300 ≤ OL |
| Cr | BL ≤ 200< X | BL ≤ 200 < X | BL ≤ 150< X |
| Br | BL ≤ 200 < X | --- | BL ≤ 200 < X |
| DBP [n] | BL ≤ 600 < X | --- | --- |
| BBP [n] | BL ≤ 600 < X | --- | --- |
| DEHP [n] | BL ≤ 600 < X | --- | --- |
| DIBP [n] | BL ≤ 600 < X | --- | --- |

(d)BL=ED-XRF 分析低于限值(Below Limit by ED-XRF analysis)，

OL=ED-XRF 分析高于限值(Over Limit by ED-XRF analysis)，IN=不确定(Inconclusive)

--- =未规定(Not regulated)，X=需要进一步检测(need further chemical analysis)

(e)对于复合材料，ED-XRF 筛选检测元素所得数据可能与样品中实际含量不同(For composite material,the ED-XRF results may be different to the actual content in the sample.)。

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(2)：化学检测及法规限值(Chemical test and regulatory limits)：

| 检测项目 (Test Items) | | 检测方法 (Test Method) | 检测仪器 (Test Equipment) | 方法检出限 (MDL) | 限值(均一材质) (Limit(by weight in homogenous materials) |
|---|---|---|---|---|---|
| Pb | | IEC 62321-5:2013 | ICP-OES/AAS | 2mg/kg | 1000mg/kg |
| Cd | | IEC 62321-5:2013 | ICP-OES/AAS | 2mg/kg | 100mg/kg |
| Hg | | IEC 62321-4:2013+AMD1:2017 | ICP-OES | 2mg/kg | 1000mg/kg |
| Cr(VI) | 金属(Metal) | IEC 62321-7-1:2015 | UV-VIS | 0.10μg/cm$^2$ | 1000mg/kg |
| | 其它(Others) | IEC 62321-7-2:2017 | UV-VIS | 8mg/kg | |
| PBBs | | IEC 62321-6:2015 | GC-MS | 5mg/kg(Each) | 1000mg/kg(Sum) |
| PBDEs | | IEC 62321-6:2015 | GC-MS | 5mg/kg(Each) | 1000mg/kg(Sum) |
| DBP | | IEC 62321-8:2017 | GC-MS | 30mg/kg | 1000mg/kg |
| BBP | | IEC 62321-8:2017 | GC-MS | 30mg/kg | 1000mg/kg |
| DEHP | | IEC 62321-8:2017 | GC-MS | 30mg/kg | 1000mg/kg |
| DIBP | | IEC 62321-8:2017 | GC-MS | 30mg/kg | 1000mg/kg |

(a) 化学检测结果的单位：金属的 Cr(VI)是μg/cm$^2$，其余均为 mg/kg(Unit of Chemical test result: Cr(VI)of metal:μg/cm$^2$,Other:mg/kg)；1mg/kg=1ppm=0.0001%, N.D. =未检出(低于方法检出限)(not detected (less than method detection limit))，MDL=Method Detection Limit 方法检出限，--- =未进行检测(Not Conducted)

(b)金属镀层中(For corrosion-protected coatings on metals)

a. 当六价铬的浓度高于 0.13μg/cm$^2$ 时，样品为阳性，即含有六价铬(The sample is positive for Cr(VI) if the Cr(VI) concentration is greater than 0.13μg/cm$^2$. The sample coating is considered to contain Cr(VI))；

b. 当六价铬的浓度为N.D.(低于 0.10μg/cm$^2$ )时，样品为阴性，即未检测到六价铬(The sample is negative for Cr(VI) if Cr(VI) is N.D. (concentration less than 0.10μg/cm$^2$). Thecoating is considered a non-Cr(VI) based coating)；

c. 当六价铬的浓度介于 0.10μg/cm$^2$ 与 0.13μg/cm$^2$ 之间时，无法直接判定是否检测到六价铬，因不同个体的样品表面差异可能会影响测定结果(The result between 0.10μg/cm$^2$ and 0.13μg/cm$^2$ is considered to be inconclusive -unavoidable coating variations may influence the determination)；

由于未获知样品的存储条件和生产日期，样品的六价铬检测结果仅能代表检测时样品含六价铬的状态(Information on storage conditions and production date of the tested sample is unavailable and thus Cr(VI) results represent status of the sample at the time of testing.)。

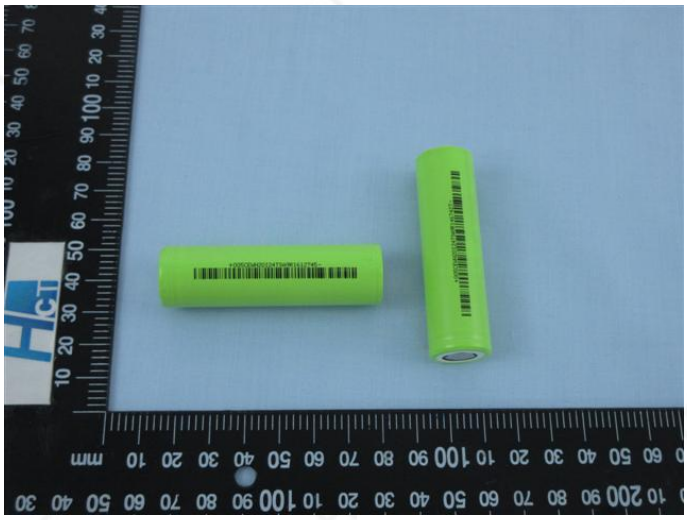
(3) 对本报告图片中标识的样品进行筛选及化学检测(Screening and chemical tests were performed for the samples indicated by the photo in this report.)。

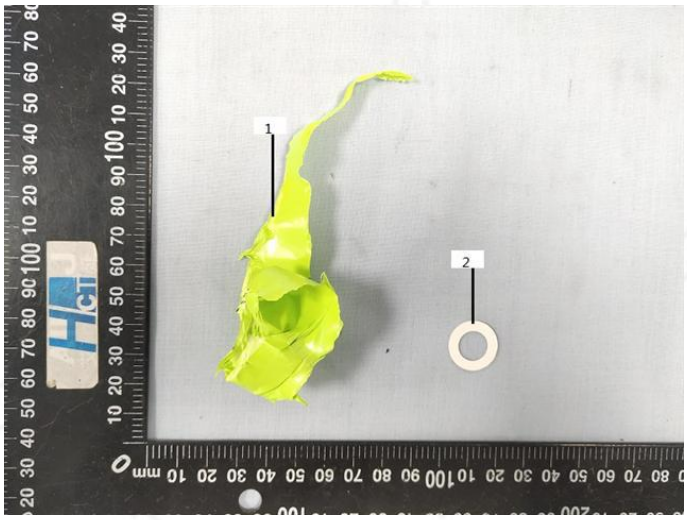
Shenzhen Hongcai Testing Technology Co., Ltd 深圳市虹彩检测技术有限公司 报告专用章

# 验证报告(Verification Report)

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## 样 品 附 图(The photo of the sample)












**WTH20H11090516C**

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