MERJENJE SPREMEMBE KAPACITETE BATERIJE TELEFONA

PHONE BATTERY CAPACITY CHANGE MEASURMENTS

POVZETEK

Za temo te raziskave sva se odločila, ker sva se hotela osredotočiti na moderen ter aktualen problem, ter zanj poiskati praktično ter učinkovito rešitev. Ker so mobilne naprave stalnica moderne potrošniške družbe, meniva, da je prepogosto in predolgo polnjenje le teh povzročitelj staranja baterije, kar posledično pomeni, da je menjava telefona v roku daljšega časovnega obdobja neizbežna. V skladu s tem, sva si zadala načrt izdelave polnilne postaje, ki s polnjenjem naprave v določenem časovnem intervalu rešuje problem staranja galvanskega člena funkcionalno. Seveda pa so pred tem pomembne tudi meritve, ki dokažejo ali problem sploh obstaja. V skladu z zadanim sva si postavila tri raziskovalna vprašanja, ki sva jih tekom naloge poskušala potrditi ali ovreči. Hipoteze so bile sledeče: Polnjenje telefona v daljšem časovnem intervalu poškoduje baterijo, ter povzroči, da se baterija prehitro stara. Stanje baterije se v krajšem časovnem obdobju ne bo spremenilo. Kapaciteta baterije se ne zmanjšuje premo enakomerno s časom. Tako sva se sočasno lotila izvajanja meritev ter sestave prenosne solarne polnilne postaje. Merila sva spremembo stanja baterije dveh telefonov v obdobju 36 dni. Prvi prvem telefonu sva želela poustvariti učinek prepolnjenja tako, da sva telefon polnila dalj časa kot je priporočeno. Medtem sva drug telefon polnila v priporočenem časovnem intervalu s pomočjo stikalne ure, ki dovoljuje nastavitev točnega trajanja polnjenja. Prve meritve izhodne amperaže (ki se s staranjem galvanskega člena spreminja) sva izvedla po 36 dneh, nato pa še dve meritvi po 14 dni narazen. Rezultati so po pričakovanju potrdili eno od treh najinih hipotez. Zaradi spremembe izhodnega električnega toka druge naprave ter enakomernega stanja druge, sva potrdila, da prepolnjenje res vpliva na staranje galvanskega člena. Ker so bile spremembe amperaže drugega telefona vidne že po 36 dneh sva s tem ovrgla hipotezo, da se stanje po krajšem časovnem obdobju ne bo spremenilo. Hkrati pa sva zaradi linearnega padanja izhodnega toka druge naprave ovrgla tudi hipotezo o nesorazmernem zmanjševanju kapacitete baterije. Ker sva raziskavo še vedno izvajala v relativno kratkem časovnem obdobju se v naprej odpira vprašanje kot je koliko časa bi trajalo, da kapaciteta baterije pri stalnem prepolnjenju pade pod standarde normalnega delovanja oziroma ali je mit o najučinkovitejšem delovanju baterije med 50 in 80% učinkovita.

SUMMARY

We chose this research topic because we wanted to focus on a modern and topical problem and find a practical and effective solution to it. As mobile devices are a fixture of modern consumer society, we believe that charging them too often and for too long is a cause of battery ageing, which means that replacing your phone within a longer period of time is

inevitable. Accordingly, we set out to build a charging station that solves the problem of galvanic cell ageing functionally by charging the device at a specific time interval. Of course, before that, it is important to have measurements to prove whether there is a problem at all. Thus, we set ourselves three research questions, which we sought to confirm or refute during the course of the project. The hypotheses read as follows: charging the phone for a long period of time damages the battery and causes it to age too quickly. The battery status will not change over a short period of time. Battery capacity does not decrease very steadily over time.

So we set about making measurements and building a portable solar charging station at the same time. We measured the change in battery life of two phones over a period of 36 days. On the first phone, we wanted to recreate the overcharging effect by charging the phone for longer than recommended. In the meantime, we charged the other phone at the recommended interval using the time switch clock, which allows you to set the exact charging duration. The first measurements of the output amperage (which changes as the cell ages) were taken after 36 days, followed by two more measurements 14 days apart. As expected, the results confirmed one of our three hypotheses. Due to the change in the output current of the second device and the steady state of the latter, we confirmed that overcharging does indeed affect the ageing of the galvanic cell. As the changes in the amperage of the second phone were already visible after 36 days, this disproved the hypothesis that the situation would not change after a shorter period of time. At the same time, the hypothesis of a disproportionate decrease in battery capacity was also refuted due to the linear decrease in the output current of the second device. As the research was still being conducted for a relatively short period of time, questions were raised for the future, such as how long it would take for the battery capacity to drop below normal operating standards if it was constantly overcharged, or whether the myth of a battery operating most efficiently between a 50%-80% capacity held any truth.