

## Background

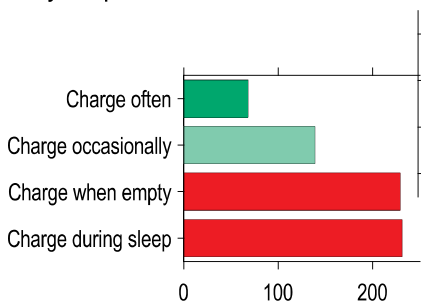
- ▶ Lithium-ion batteries (LIBs) are increasingly **important**
- ▶ Recharging is the key maintenance step for LIBs
- ▶ Consumers may be **uninformed** or even **misinformed** about best practices for charging
- ▶ Previous research has shown general best practices
- ▶ This work **measures public knowledge and habits** about battery charging
- ▶ The work also points to future educational and technical efforts

## Methods

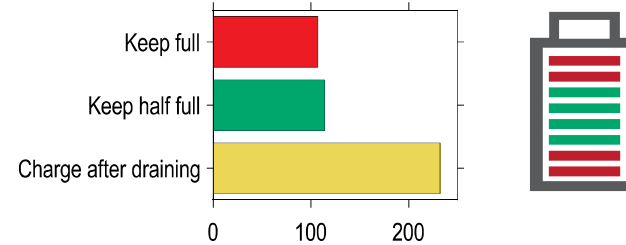
- ▶ **Surveyed** adults in the USA via Amazon MTurk, Qualtrics
- ▶ Received 453 valid responses
- ▶ Survey touched on questions about knowledge and habits that provide sufficient information regarding all user controlled degradation mechanisms
- ▶ The most important results were reviewed

## Results

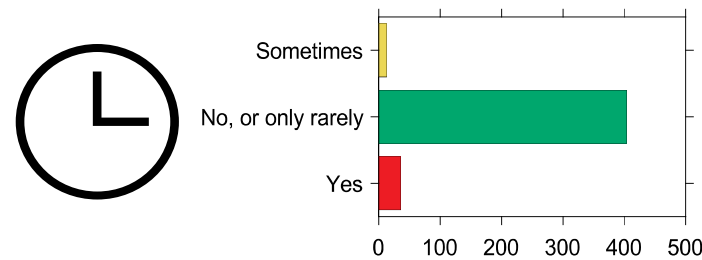
1. On most days, **how do you charge** your phone?



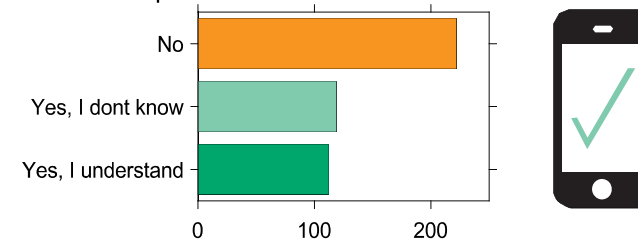
2. What would you say is the best way to charge your phone in order to promote battery health over several years?



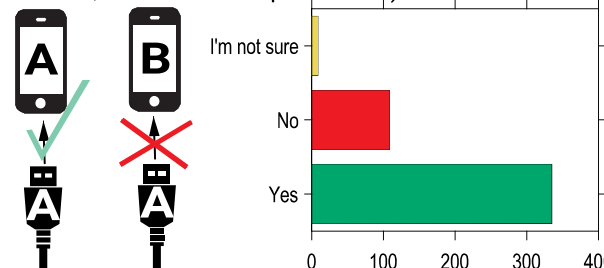
3. Do you turn off your phone when you sleep or overnight?



4. Are you aware of the optimized battery charging features on newer phones?



5. For most of your phone's charging needs, do you use the charger that came with your device (or an identical, brand-name replacement)?



## Discussion

- ▶ 51% of respondents believed that the correct practice is to charge after draining completely.
- ▶ 78% of respondents provided evidence of carrying out large State of Charge (SoC) cycles.
- ▶ 74% of users used the recommended device chargers that came with their device.
- ▶ Newly presented optimization software is widely unknown; 49% of users are unknowledgeable of its existence.

### Recommended Optimized Charging Practices Based on Previous Study and Results

- ▶ Keep your battery around 50 percent SoC as often as possible
- ▶ Limit the amount of time you let your battery reach 0 percent SoC or above 80 percent SoC
- ▶ Use the charger given to you from your phone producer
- ▶ Charge your phone as often as possible while maintaining best SoC conditions
- ▶ Optimized charging software, if available, needs to be enabled
- ▶ Do not power your phone off at night completely

## Further Outreach/Study

- ▶ Universally accepted charging practices need to be further quantitatively defined in a review
- ▶ Campaigns can be presented in the form of some or all of the components of the "Recommended Optimized Charging Practices"