**ABSTRACT**

Na and K ion batteries are necessary for the development of renewable energy and storage. Na and K are more abundant than Li and can have a more sustainable supply. Developing electrodes which are as efficient as Li batteries is essential.

**MOTIVATION**

Prussian Blue (PB) and Prussian White (PW) potentially could be used as a high capacity, long cycle life positive electrode in Na or K ion batteries. Having a reliable synthesis method is essential for the development of these materials.

**METHODS**

- NaPB and K-PB were synthesised.
- Samples contained NaCl and FeO₃, or KCl impurity. KCl almost negligible quantity.
- Using HCl and ascorbic acid starting reagents had lower intensity for the impurities.

X-RAY DIFFRACTION AND TGA DATA

- Na-PB and K-PB were synthesised.
- Samples contained NaCl and FeO₃, or KCl impurity. KCl almost negligible quantity.
- Using HCl and ascorbic acid starting reagents had lower intensity for the impurities.

**CYCLING AND SEM DATA**

Na-PB has a max capacity of 93mAH/g and gradually decreases in capacity before settling at 50mAH/g. K-PB only has a max capacity of 37mAH/g. Primarily this is due to the delamination of the electrodes. The materials are phase stable.

**X-RAY DIFFRACTION AND TGA DATA**

- Na-PB and K-PB were synthesised.
- Samples contained NaCl and FeO₃, or KCl impurity. KCl almost negligible quantity.
- Using HCl and ascorbic acid starting reagents had lower intensity for the impurities.

**CONCLUSIONS**

- Co – precipitation method works best with FeCl₃, 4H₂O and H₂O, which are therefore better starting reagents than HCl and ascorbic acid.
- Co – precipitation method does require repeated washing.
- Synthesis under 8mmol gives a poor yield.
- KFe(CN)₆ is a better starting reagent than KFe(CN)₆ for K PB synthesis.
- PW is air sensitive and can only be synthesised using Na PB as the starting reagent in an inert atmosphere.

**REFERENCES**


**NEXT STEPS**

- Repeat the electrochemical tests for the K-PB.
- Investigate more methods for PW synthesis and perform electrochemical tests on it.

**X-RAY DIFFRACTION AND TGA DATA**

- Na-PB and K-PB were synthesised.
- Samples contained NaCl and FeO₃, or KCl impurity. KCl almost negligible quantity.
- Using HCl and ascorbic acid starting reagents had lower intensity for the impurities.

**X-RAY DIFFRACTION AND TGA DATA**

- Na-PB and K-PB were synthesised.
- Samples contained NaCl and FeO₃, or KCl impurity. KCl almost negligible quantity.
- Using HCl and ascorbic acid starting reagents had lower intensity for the impurities.

**X-RAY DIFFRACTION AND TGA DATA**

- Na-PB and K-PB were synthesised.
- Samples contained NaCl and FeO₃, or KCl impurity. KCl almost negligible quantity.
- Using HCl and ascorbic acid starting reagents had lower intensity for the impurities.

**X-RAY DIFFRACTION AND TGA DATA**

- Na-PB and K-PB were synthesised.
- Samples contained NaCl and FeO₃, or KCl impurity. KCl almost negligible quantity.
- Using HCl and ascorbic acid starting reagents had lower intensity for the impurities.

**X-RAY DIFFRACTION AND TGA DATA**

- Na-PB and K-PB were synthesised.
- Samples contained NaCl and FeO₃, or KCl impurity. KCl almost negligible quantity.
- Using HCl and ascorbic acid starting reagents had lower intensity for the impurities.

**X-RAY DIFFRACTION AND TGA DATA**

- Na-PB and K-PB were synthesised.
- Samples contained NaCl and FeO₃, or KCl impurity. KCl almost negligible quantity.
- Using HCl and ascorbic acid starting reagents had lower intensity for the impurities.

**X-RAY DIFFRACTION AND TGA DATA**

- Na-PB and K-PB were synthesised.
- Samples contained NaCl and FeO₃, or KCl impurity. KCl almost negligible quantity.
- Using HCl and ascorbic acid starting reagents had lower intensity for the impurities.

**X-RAY DIFFRACTION AND TGA DATA**

- Na-PB and K-PB were synthesised.
- Samples contained NaCl and FeO₃, or KCl impurity. KCl almost negligible quantity.
- Using HCl and ascorbic acid starting reagents had lower intensity for the impurities.

**X-RAY DIFFRACTION AND TGA DATA**

- Na-PB and K-PB were synthesised.
- Samples contained NaCl and FeO₃, or KCl impurity. KCl almost negligible quantity.
- Using HCl and ascorbic acid starting reagents had lower intensity for the impurities.

**X-RAY DIFFRACTION AND TGA DATA**

- Na-PB and K-PB were synthesised.
- Samples contained NaCl and FeO₃, or KCl impurity. KCl almost negligible quantity.
- Using HCl and ascorbic acid starting reagents had lower intensity for the impurities.

**X-RAY DIFFRACTION AND TGA DATA**

- Na-PB and K-PB were synthesised.
- Samples contained NaCl and FeO₃, or KCl impurity. KCl almost negligible quantity.
- Using HCl and ascorbic acid starting reagents had lower intensity for the impurities.

**X-RAY DIFFRACTION AND TGA DATA**

- Na-PB and K-PB were synthesised.
- Samples contained NaCl and FeO₃, or KCl impurity. KCl almost negligible quantity.
- Using HCl and ascorbic acid starting reagents had lower intensity for the impurities.

**X-RAY DIFFRACTION AND TGA DATA**

- Na-PB and K-PB were synthesised.
- Samples contained NaCl and FeO₃, or KCl impurity. KCl almost negligible quantity.
- Using HCl and ascorbic acid starting reagents had lower intensity for the impurities.

**X-RAY DIFFRACTION AND TGA DATA**

- Na-PB and K-PB were synthesised.
- Samples contained NaCl and FeO₃, or KCl impurity. KCl almost negligible quantity.
- Using HCl and ascorbic acid starting reagents had lower intensity for the impurities.