

Synthesis of novel Lithium Adducts as Precursors for Lithium containing phases

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Horizon 2020
European union funding
For Research & Innovation
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OVERVIEW



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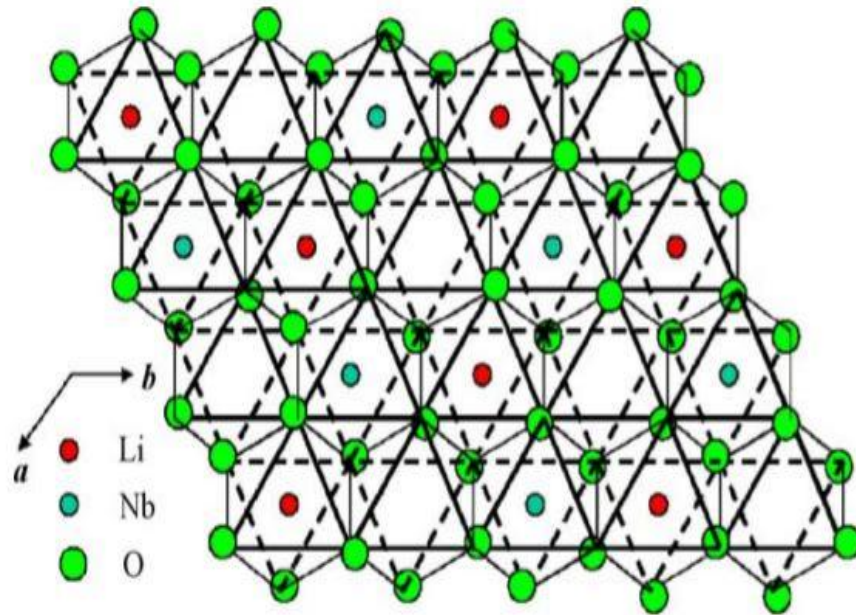
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- What is ENHANCE
- Materials in Focus
- Precursor choice
- Methodology
- Results (synthesis)
- Results (Deposition)
- Conclusions



- [illegible]

Advantages



Lithium Niobate (LiNbO_3)

- Ferroelectric
- Piezoelectric
- Silicon of Photonics (High optical property)
- Low toxicity in comparison to PZT

Precursors



Standard Li precursors vs β -diketone

Standard
Precursors

β -Diketone

TRIALKYLSILYLAMIDES

LI DIALKYLAMIDES

LITHIUM ALKOXIDES

Li CYCLOPENTADIENYLS

LITHIUM ARYLS

LITHIUM ALKYLs

LITHIUM NITRIDES

Li-Nb ALKOXIDES

LiNb ALKOXIDE-DIKETONATE

Relatively
high cost

Sensitivity
to moisture

Inflammable

Low toxicity

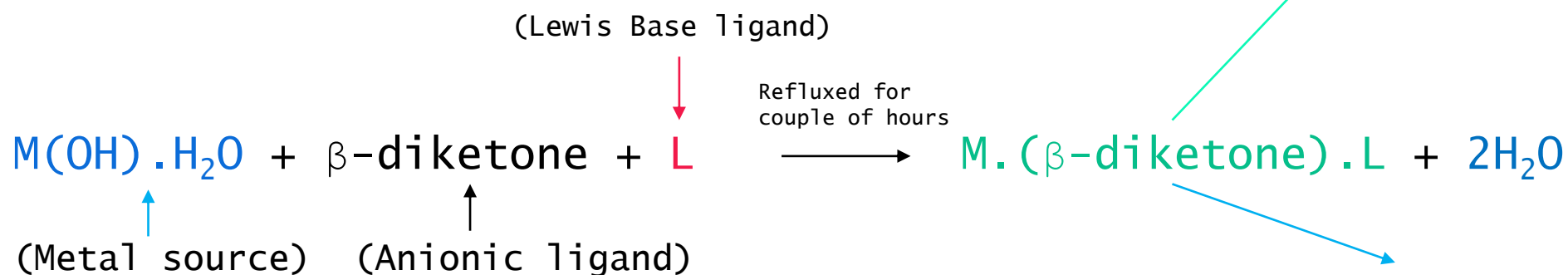
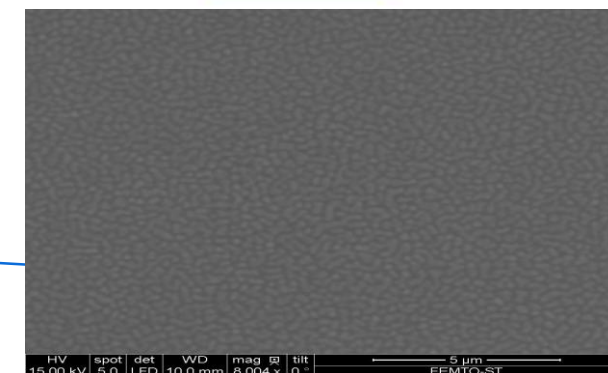
High
denticity

Chelating
property

High
volatility

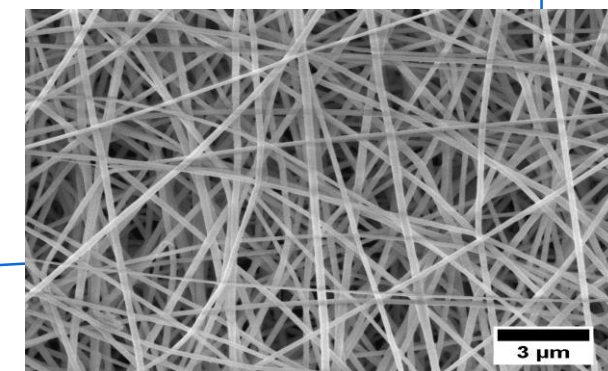
Experimental Process Developed

LN thin film
Prof. Ausrine
Bartasyte
University of
Franche Comte



Suitable
solvent

KNN nanowires,
Arun Ichangi,
Prof. Mathur
University of
Cologne



- $\text{Li}_6(\text{hfa})_6 \cdot 0.5\text{monoglyme} \cdot 2\text{H}_2\text{O}$ - SOLID
- $\text{Li}_2(\text{hfa})_2 \cdot \text{diglyme} \cdot \text{H}_2\text{O}$ - SOLID
- $\text{Li}(\text{hfa})\text{triglyme}$ - LIQUID
- $\text{Li}(\text{hfa})\text{tetraglyme}$ - LIQUID

Thin Film Deposition and Characterization

In collaboration with Prof. Ausrine Bartasyte and Prof. Samuel Margueron,
University of Franche Comte, France



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Precursors used: $\text{Li}_6(\text{hfa})_6 \cdot 0.5\text{monoglyme} \cdot 2\text{H}_2\text{O}$ & $\text{Nb}(\text{thd})_4$

Solvent used: Monoglyme

CONCLUSIONS



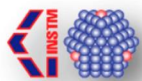
β -diketone ligands form stable alkali metal complexes which can also be utilized for MOCVD applications.



Dr. Anna Pellegrino, stand 1,
Na-Y- β -diketonate, thursday



$\text{Li}_6(\text{hfa})_6 \cdot 0.5 \text{ monoglyme} \cdot 2\text{H}_2\text{O}$
shows good thermal behavior and volatility as a single metal source of Li for deposition of LN thin films.



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FUTURE WORK



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- Calculation of Li_2O composition in LiNbO_3
- Comparison of the deposition results w.r.t Li(thd)
- Focus on double metal precursors Li and Nb metal centers

Collaborations



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THANK YOU

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