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# Application of Green Reagent Lithium Chloride in Pharmaceutical Techniques

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**Abstract:** Apply green reagent lithium chloride in pharmaceutical techniques can bring green chemical nature of lithium into play, and further understand the effective role of lithium chloride in pharmaceutical techniques. For this perspective, this paper gives a brief analysis for the application of green reagent lithium chloride in pharmaceutical techniques with actual examples.

**Keywords:** Green Reagent; Lithium Chloride; Pharmaceutical Techniques; Application Analysis

## 1. Introduction

From the pharmaceutical technology research it is not difficult to find that lithium chloride has the characteristics of low cost, non-polluting, and recycling, which belongs to green reagent; its scientific and effective application can enhance the drug synthesis reaction, optimize the reaction process, and improve economic efficiency. Therefore, applying the advanced results of green reagent lithium chloride into pharmaceutical techniques can achieve the effective application of green chemistry. Lithium chloride is a sodium chloride type structure in which the chemical bond is not a typical ionic bond, so it can be dissolved in many organic solvents, and can form different adducts with ethanol, methanol, and amines. This property can be used to separate lithium chloride from alkali metal chlorides.

## 2. Application of Lithium Chloride in Rimonabant

In the earliest study, organic lithium reagent was selected to connect the Rimonabant. This reagent required high for air humidity and needs more economic investment; lithium hexamethyldisilazide (LiHMDS) belongs to a condensing agent, and it is a Claisen condensation of chlorobenzene acetone and diethyl oxalate. Lithium chloride accelerates the reaction of non-activated bromoarenes and short-chain fatty acids. Analysis based on green low-carbon and economic inputs shows that the reagent LiHMDS cannot meet the specific needs of larger areas of intermediate production. According to the survey, Claisen condensation reaction of chlorophenone acetone and diethyl oxalate belongs to the hindered Claisen condensation, and it is significantly different from no hindered Claisen condensation reaction. The selection of organic lithium reagent LiHMDS for the condensation reagent will contribute to the polymerization of lithium carbon atoms to carbonyl oxygen atoms, and the formed 3-methyl-2,4, -diketoate intermediates can be a six-membered ring lithium salt way to stabilize intermediates. Therefore, LiHMDS can play a role of media, and then prepare intermediates with 2,4- 2- chlorophenylhydrazine cyclization. Lithium chloride produces lithium under the condition of controlling reaction property, and then the LiHMDS with high economic cost is replaced by base formed by sodium methoxide to form green pharmaceutical technology.

## 3. Lithium Chloride Accelerates the Reaction of Non - Activated Bromoarenes and Short - Chain Fatty Acids

Alkali metal exists in the ocean and salt lake through different ways. It has the characteristics of harmless and protective of ecological environment. Lithium chloride cost less investment and can be converted to lithium carbonate for easy separation and recycling. Lithium, sodium, and potassium belong to the same main group. However, there are significant differences in their structures and then show a special chemical properties. Lithium ion radius is of 0.76 (sodium ion radius is of 1.02, potassium ion radius is of 1.33). Relative to the potassium ion and sodium ion, lithium ion radius of single electron layer is small. Therefore, the lithium compounds have significant differences with sodium and potassium compounds covalent and with lithium ions on the affinity of electron-rich nonmetallic atoms. In particular, lithium ions show higher affinity for oxygen. Due to the different chemical properties, the application of alkali metal in pharmaceutical synthesis and pharmaceutical processes plays an important role.

Non-activated bromoarenes and methoxylated sodium methoxide have the reaction pathway of a large spatial value, which is suitable for industrial applications. The successful research and development of methoxylation is mainly due to the negative ions on the reduction of copper ions is slow, making the copper ion accelerate the

coupling reaction. If the methoxylation reaction is applied in the short chain alkoxy anion reduction is higher than the methoxy anion. In the negative ion state, the copper ion can be quickly reduced to elemental copper to eliminate the catalytic properties. According to the relevant study it is found that lithium-ion affinity can accelerate the reaction of lithium alkoxide and sodium alkoxylate dimer. However, the dimer has no obvious reduction of the copper ion, and the catalytic activity of the copper ion is obvious and then followed by the alkoxylation reaction. Subsequently, the ligand-free alkoxylation reaction was incorporated into the formation of ethyl vanillin, clove aldehyde compounds, and drug pumocaine.

## 4. Application of Lithium Chloride in Multi-functional Grignard Reagent

The reagent reaction relies too much on the heat of reaction, and the optimized Grignard reagent should be preheated. During the reaction process of Grignard reagents and inactive electrophilic reagents, the premise requires a certain degree of heat. If the Grignard reagent is formed at low temperature and the lack of low temperature reaction activity is eliminated, the fusion of Grignard reagent and different functional groups is achieved. A foreign research team takes lithium chloride as a catalyst, effectively integrates contain multi-organism Grignard reagent. The team combines with different reaction requirements and substrate functional group fusion requirements, forms a different multi-functional Grignard reagent, and increases the applicability of the Grignard reaction.

According to the practical application of Knochel effect, generally reagent containing LiCl Grignard is called Knochel-type Grignard reagent. The combination of Knochel-type Grignard reagents and drugs can avoid complex processes. According to the analysis of coenzyme Q 9 synthesis technology, under the Knochel-type Grignard reagent conditions generating a new form of technology, called two-step synthesis. This process uses brominated phenol compounds for the materials. Based on the conditions of lithium chloride, the Green reagent *iso* -PrMgCl and phenolic hydroxyl salts form salts of phenolic magnesium. Subsequently, the tetrahydrofuran solution was rapidly injected into the Green Reagent *iso* -PrMgCl to form in situ formation of the bromoaroma Green reagent.

Under the condition of lithium chloride, the new aromatics Green reagent is converted into copper by copper iodide. Subsequently, condensation with solanyl bromide, after processing segmentation forming coenzyme Q 9 precursor. The formation of coenzyme Q 9 precursors is formed under hydroquinone and oxidizes ambient air as a target. Under catalyzing of lithium chloride, adaptability of Green reagent has been significantly improved.

## 5. Application of Lithium Chloride in Zinc Reagent

An organic zinc compound refers to a class of organic compounds containing a carbon-zinc chemical bond. Organic Zinc Chemistry is a discipline that studies the physicochemical properties, synthesis, and reaction of organic zinc compounds. The rooting coupling reaction is the reaction of forming a new carbon-carbon bond between the unsaturated carbon atoms of olefins, aromatics, and alkynes. The reaction catalyst is nickel or palladium. The key step in the catalytic cycle is the metal transfer: the palladium is exchanged with the halogen of another organic molecule under the catalysis of the palladium (nickel) metal catalyst and the hydrocarbyl groups are linked to each other. Fushan coupling reaction is another coupling reaction, and is a process of sulfide reaction forming ketone.

Foreign enterprises in the relevant research creatively selected tetramethyl piperidine zinc chloride lithium chloride reagent (TMPZnCl LiCl) the iodine purine compounds of efficient preparation core. In the study, TMPZnCl LiCl was metallized to form a halogenation reaction. After practical investigation it is found that, conversion rate for the similar products is only 10%. In view of this, expand the application of TMPZnCl LiCl reagent to expand the magnesium metallization, and for a second time convert ZnCl2 into a metallization reaction. In this way, the formed zinc purine compound intermediate has a strong reactivity, and the bromine solution is quenched at room temperature to give a bromine analogue of 95% of the desired product. This form of zinc purine compound formed by TMPZnCl LiCl and ZnCl2 reagent illustrates the rationality of lithium chloride to accelerate zinc formation.

The application of LiCl has wide range and the electrolytic production of lithium metal lithium is the most widely used. In the 19th century, the method of lithium chloride molten salt electrolysis was proposed. Metal lithium with alloys and compounds has significant effect in the atomic energy industry, chemical, aerospace, ceramics, and other industries. At present, along with advances and promotion of medical technology, LiCl is widely used in genetics, diabetes, and other researches. In the biological application of RNA and plasmid DNA purification, it is as a mutagen for pharmaceutical, environmental protection, and other industrial varieties of choices, and the cultivated bacteria formed pharmaceutical intermediates for the bacteria transformation. Based on structural studies, LiCl belongs to cationic additive, which is used in materials application and in chitin production. In order to optimize the reaction link and control requirements, the alkaline system TMPZnCl LiCl should be selected, and the effect is significant. After forming zinc intermediates, select iodine solution quenching ac-

tive intermediates, which quantitative yield of 95% of the target product, can be decomposed from the precipitation.

## 6 . Conclusions

Through comprehensive analysis, lithium chloride applied in the pharmaceutical techniques has a significant effect. In this regard, this paper discusses from the perspective of application of lithium chloride in Rimonabant, lithium chloride accelerates the reaction of non - activated bromoarenes and short - chain fatty acids, application of lithium chloride in multifunctional Grignard reagent, and application of lithium chloride in zinc reagent. It is hoped that this paper may play a useful role in the future application.

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