



**Shiraz University
Faculty of Sciences**

Ph.D. Dissertation in Organic Chemistry

**New Approaches to 2-Azetidinones Using Acid Activators,
Polymer Supported-Ketene and Their *N*-Dearylation to *N*-
Unsubstituted γ -Lactams**

**By
Maarroof Zarei**

**Supervised by
Dr Aliasghar Jarrahpour**

SEPTEMBER 2009

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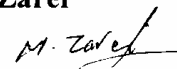
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Supported-Ketene and Their *N*-Dearylation to *N*-Unsubstituted β -Lactams**

BY:

Maarof Zarei

THESIS

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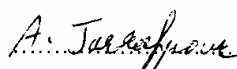
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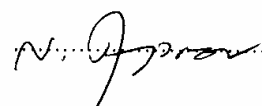
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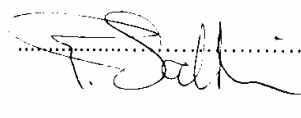
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Dedicated to:

My Family

And

My Teachers

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ABSTRACT

New Approaches to 2-Azetidinones Using Acid Activators, Polymer Supported-Ketene and Their *N*-Dearylation to *N*-Unsubstituted β -Lactams

By:

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In this thesis, the one-step Staudinger reaction of substituted acetic acids and imines for the synthesis of β -lactams using the Vilsmeier reagent (chloro methylenedimethylammonium chloride) has been reported.

Also alkoxy methylene-*N,N*-dimethyliminium salts have been used for the synthesis of β -lactams from imines and carboxylic acids in mild conditions.

p-Ethoxyphenyl group has been introduced to 2-azetidinones skeleton as a suitable *N*-protective group which can be easily removed by CAN under mild reaction conditions.

We also developed a solution phase to “on-column” *N*-dearylation of β -lactams using silica supported ceric ammonium nitrate (CAN-SiO₂). Both *N*-dearylation and purification was performed at the same time in this method.

Solvent-free methods for *N*-dearylation of 2-azetidinones in solid-solid phase by grinding with CAN or CAN-SiO₂ have been also demonstrated.

Another part of this study involves polymer-supported synthesis of 5-carboxyl-phthalimido -lactams and 3-amino- -lactams *via* Merrifield resin-bound phthaloylglycine.

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