



**Science of Synthesis**  
**The perfect Tool for your Study and Research**  
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Science of Synthesis provides full-text descriptions of organic transformations and synthetic methods as well as experimental procedures.

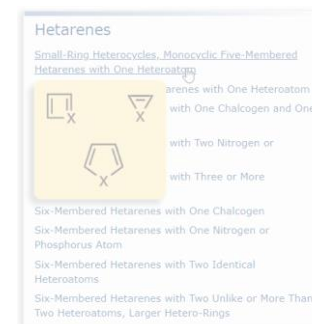
Avoid trial and error:  
 Knowing the routes that work is silver; knowing those which don't is gold (important for scale up!)

It is possible to rapidly gain an overview of an area of synthesis. What is possible is not lost amongst "too much information"

Related material is gathered together in the same place—there is no need to grind through multiple examples of the same reaction with minor differences

All hits are chemically different methods for obtaining the structure searched. This would not be possible in any other resource

SoS complements other tools as it provides immediate access to routes proven to work best in a specific context, and which are generally applicable





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How Science of Synthesis can help you to design your synthetic strategy:

- ✓ How do I synthesize this compound or similar compounds?
- ✓ Which are the most reliable chemical transformations to use in my strategy?
- ✓ What is known about this particular field of research?
- ✓ Which experts work in this field?
- ✓ Which synthetic methodology do the experts recommend?
- ✓ What is the best synthetic strategy?
- ✓ What should I avoid based on the experience of other chemists working in the field?
- ✓ Which experimental procedures should I use?
- ✓ What is the background and context to the field of research I am interested in?

*"The overall transformations are given in context together with the scope and limitations of the different methods. This allows the user to determine quickly which route will be effective or not."*



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25.6.6.4.2 Variation 2: Formylation in Solvent-Free Conditions Using Microwaves

DOI: 10.1055/sos-SD-025-00443

Schall, A.; Reiser, O., *Science of Synthesis*, (2007) 25, 619.

After formation of the Vilsmeier–Haack reagent (iminium salt **11**) at 0–5°C, the actual formylation of the arene requires heating and reaction times of several hours. Consequently, an important improvement was discovered when dielectric heating by microwave irradiation was used in this process, resulting in significantly reduced reaction times and generally higher yields of the arenecarbaldehydes **14** (Table 9).<sup>[80]</sup> Moreover, by grafting the substrates and reagents onto silica gel no solvents are necessary, making this variation attractive also from an ecological point of view.

**Table 9** Solvent-Free Vilsmeier–Haack Formylation Using Microwave Irradiation<sup>[80]</sup>

$$\text{Ar}^1\text{H} + \text{Me}_2\text{N}=\text{C}(\text{Cl})\text{Me} + (\text{PO}_2\text{Cl}_2)^- \xrightarrow{\text{silica gel, microwave}} \text{Ar}^1\text{CHO} \quad \mathbf{14}$$

Ar <sup>1</sup>	Ratio (Substrate/Reagent)	Time (min)	Yield (%)	Ref
	1:2	1.5	89	[80]
	1:3	1.5	92	[80]

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Synthesis in Context

"In order to approve (or apply for) a chemistry patent I need to be sure that the idea is new, industrially applicable and involves some form of inventive step."



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