Supplementary Information for

Hydroformylation of olefins and reductive carbonylation of aryl halides with syngas formed *ex situ* from dehydrogenative decarbonylation of hexane-1,6-diol

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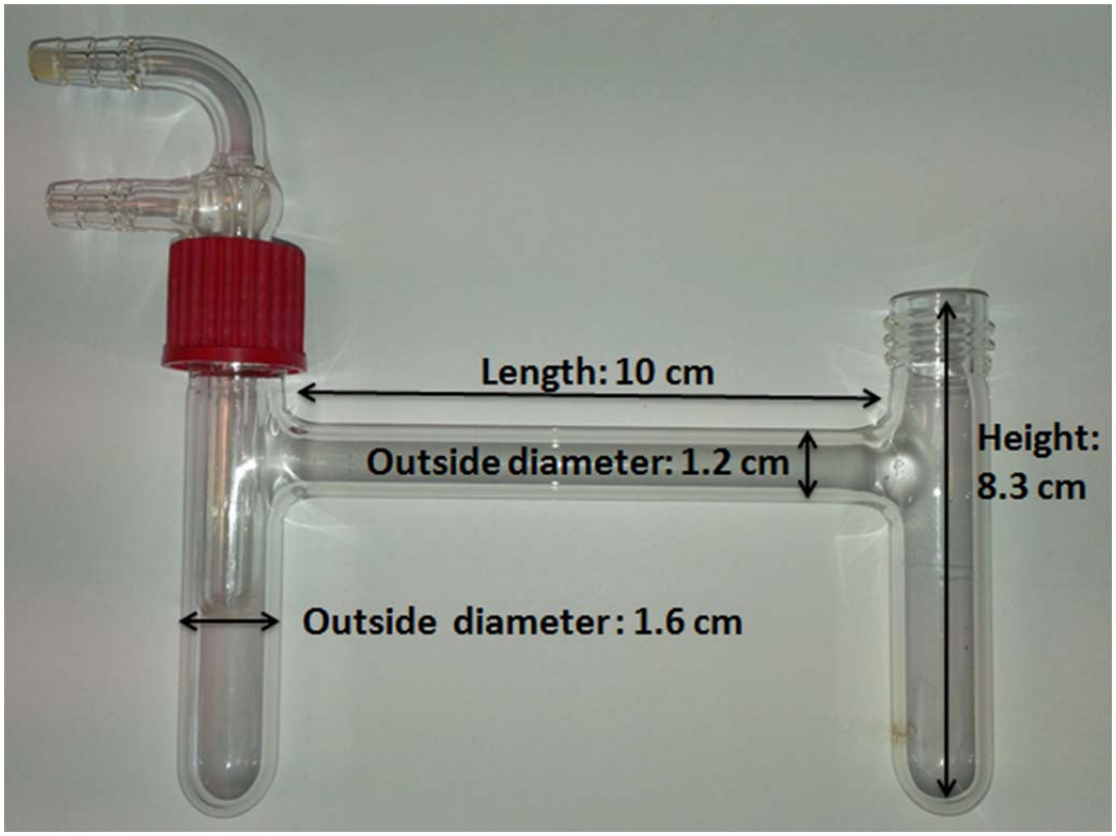
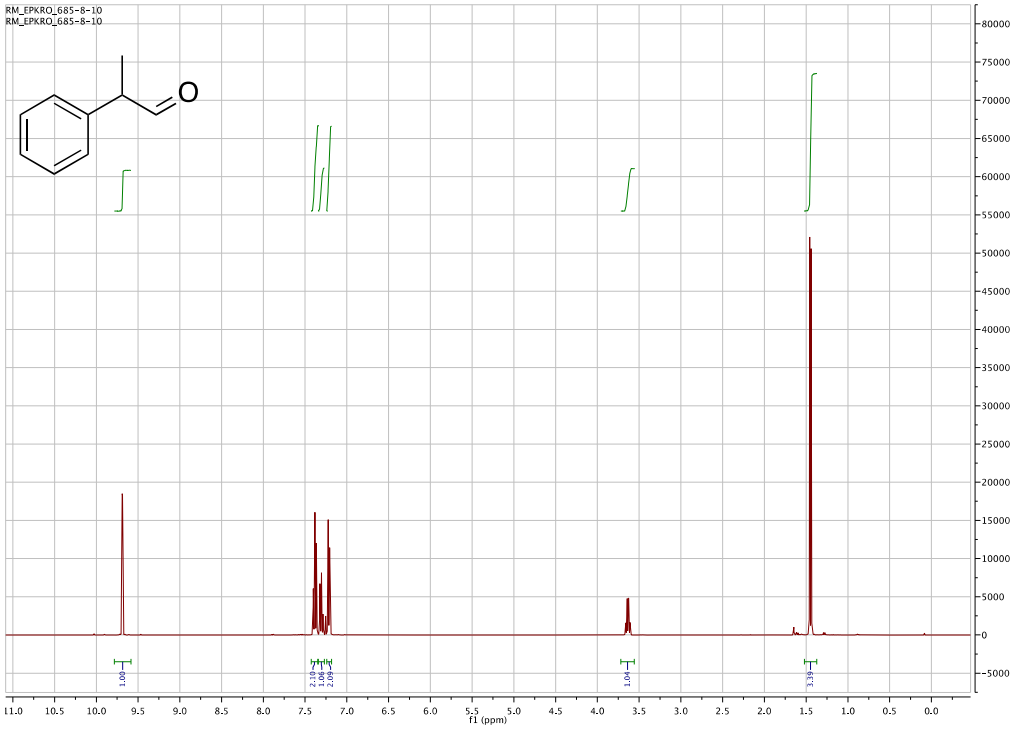
Reaction setup

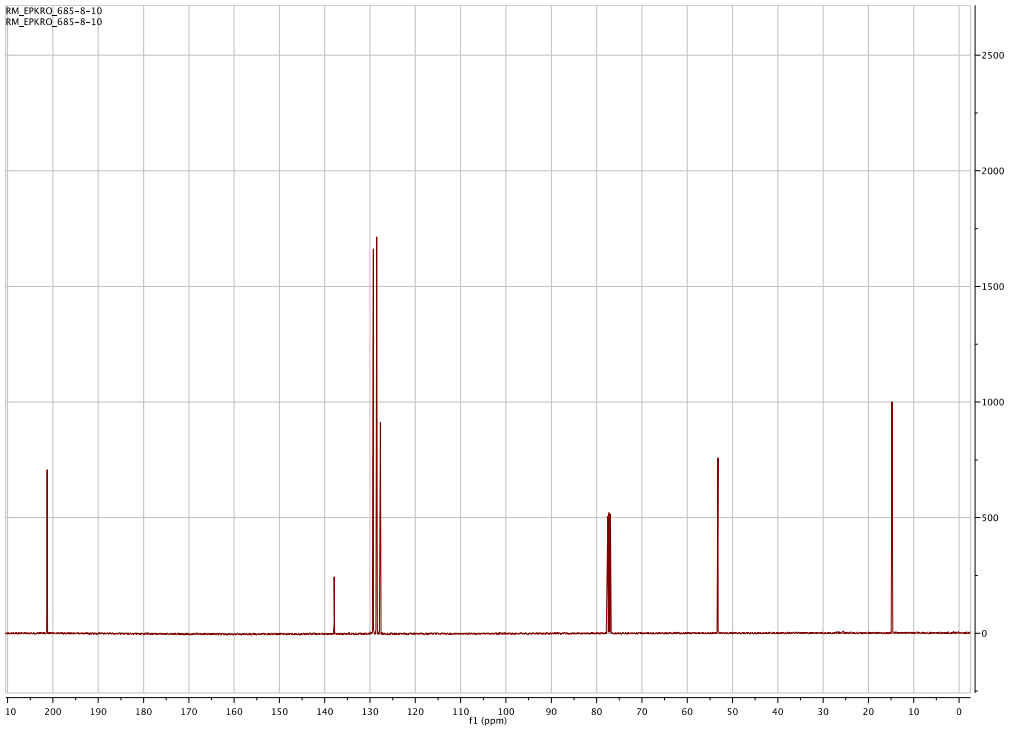
Glassware was designed as shown in the picture below. The syngas-producing chamber is shown on the left with the attached coldfinger. The cap contained a hole with a removable donut-shaped rubber septum, which made the system completely air tight when screwed together. The coldfinger was necessary to prevent diffusion of mesitylene into the syngas-consuming chamber on the right. The two chambers were connected by a tube long enough to allow for the two reactions to be run at significantly different temperatures. The total inner volume of the system was 22 mL when the coldfinger was in place.



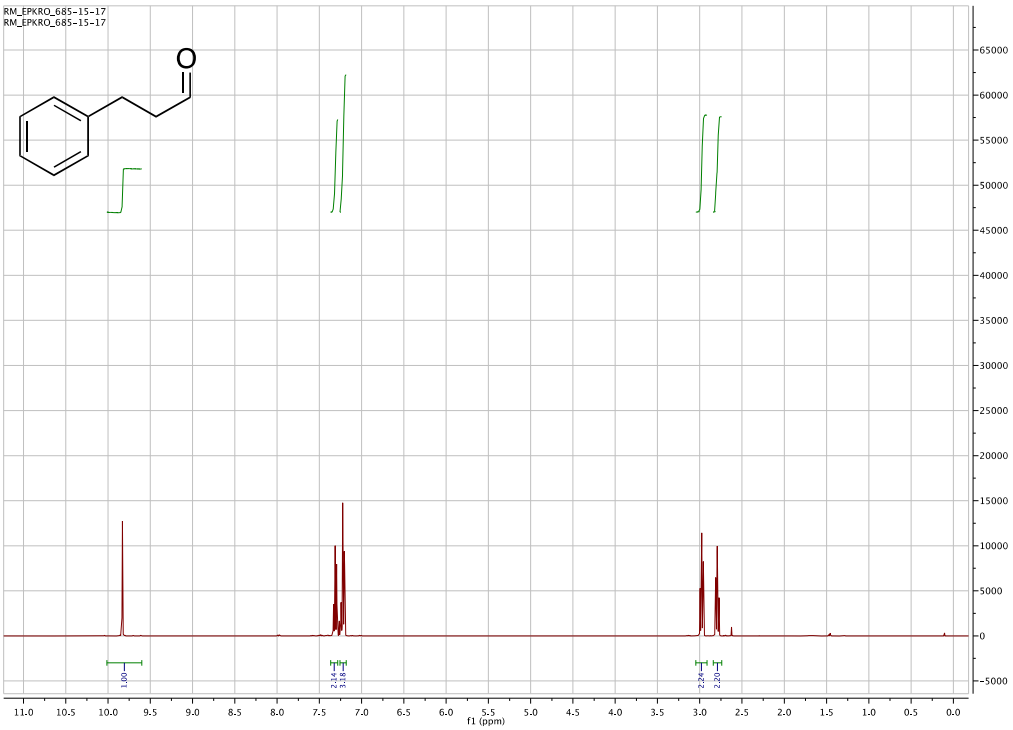
NMR spectra: hydroformylation

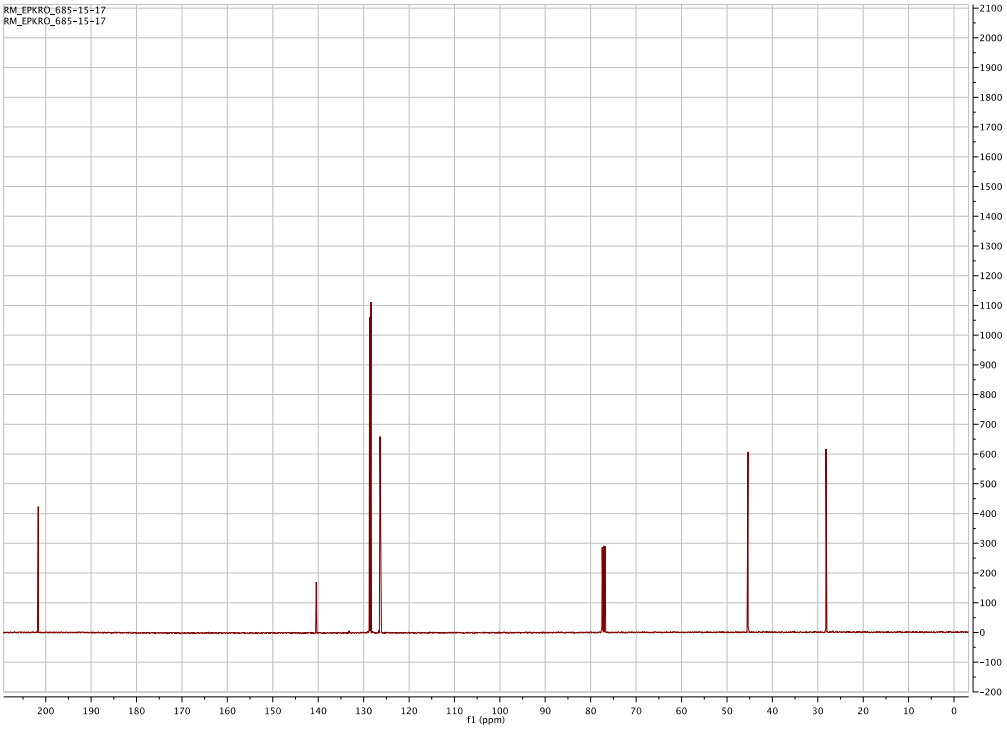
2-Phenylpropanal



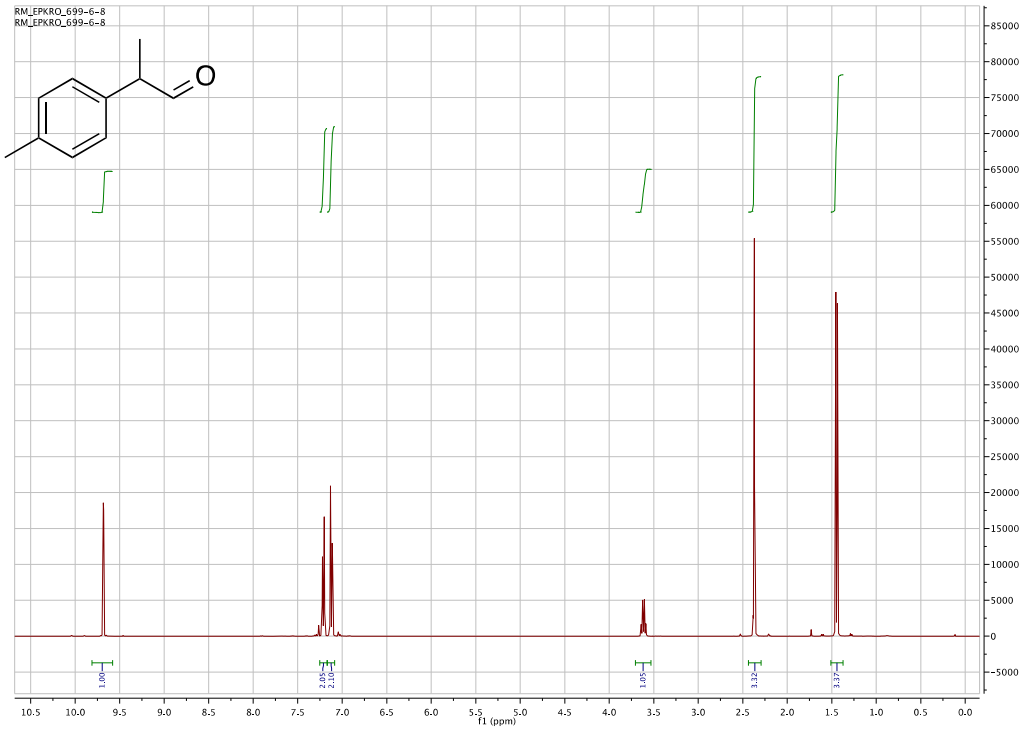


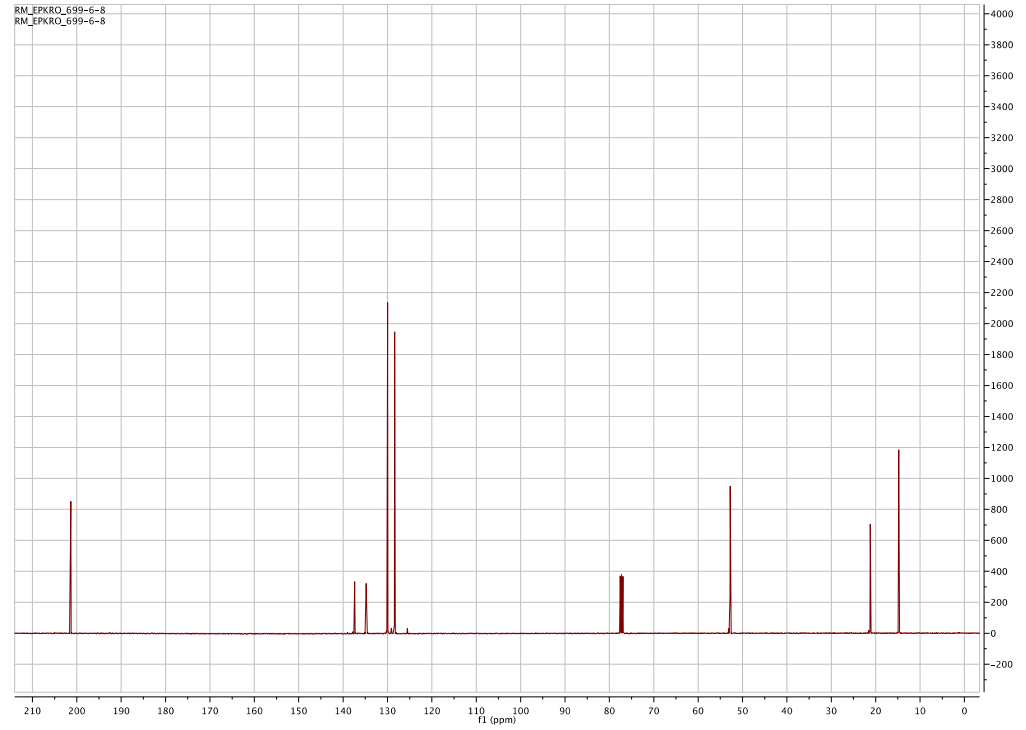
3-Phenylpropanal





2-(4-Methylphenyl)propanal





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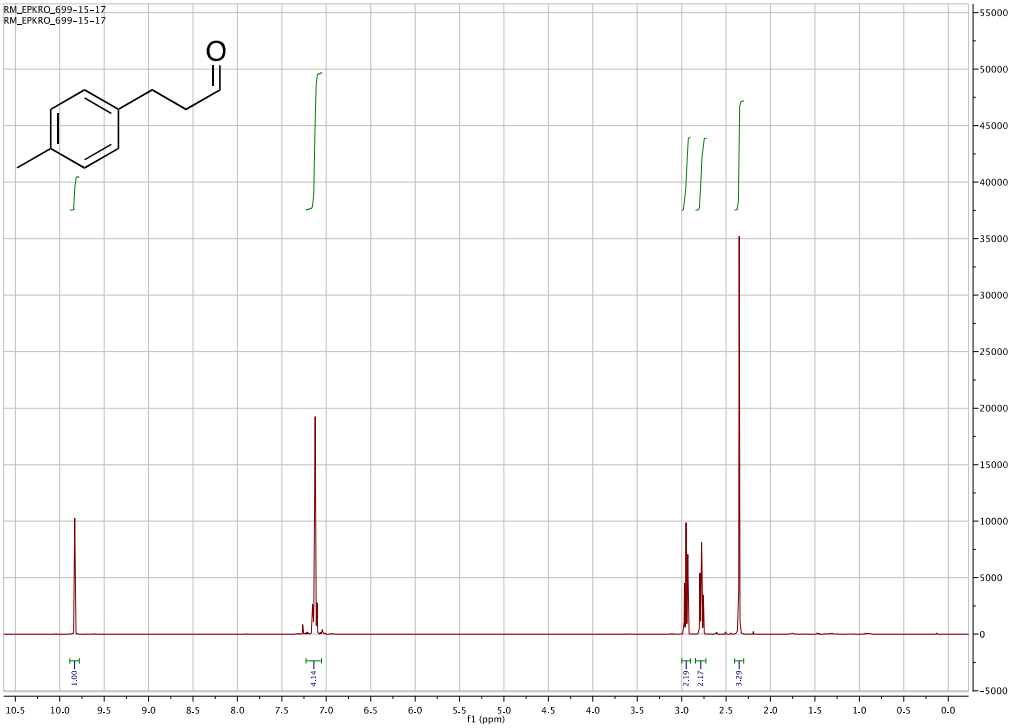
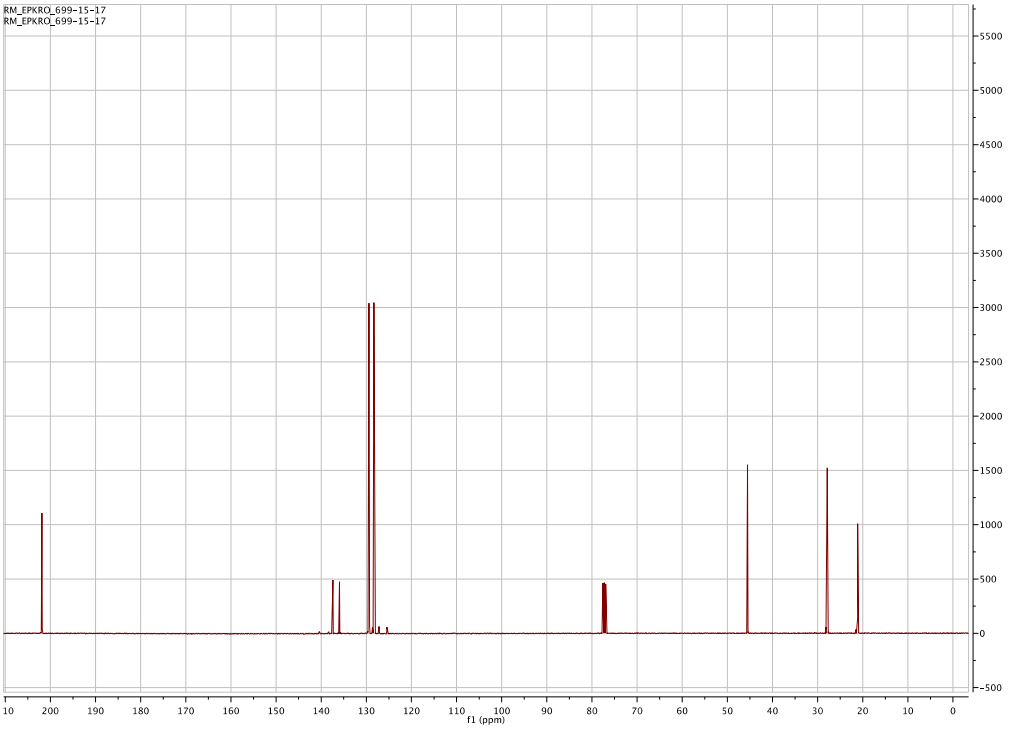
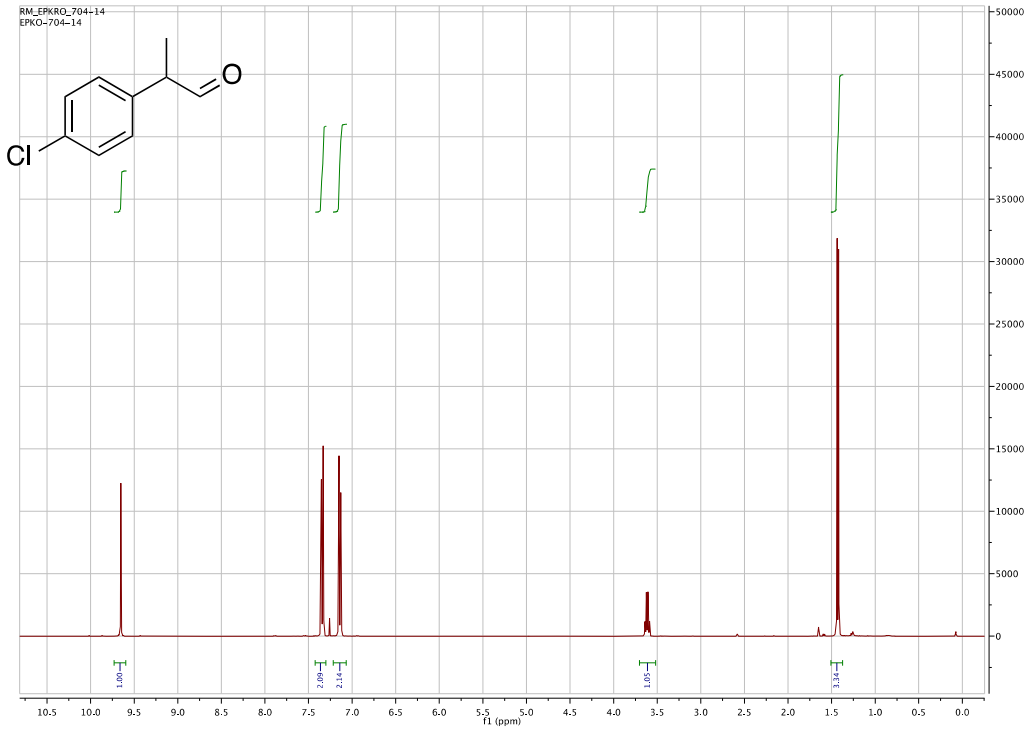
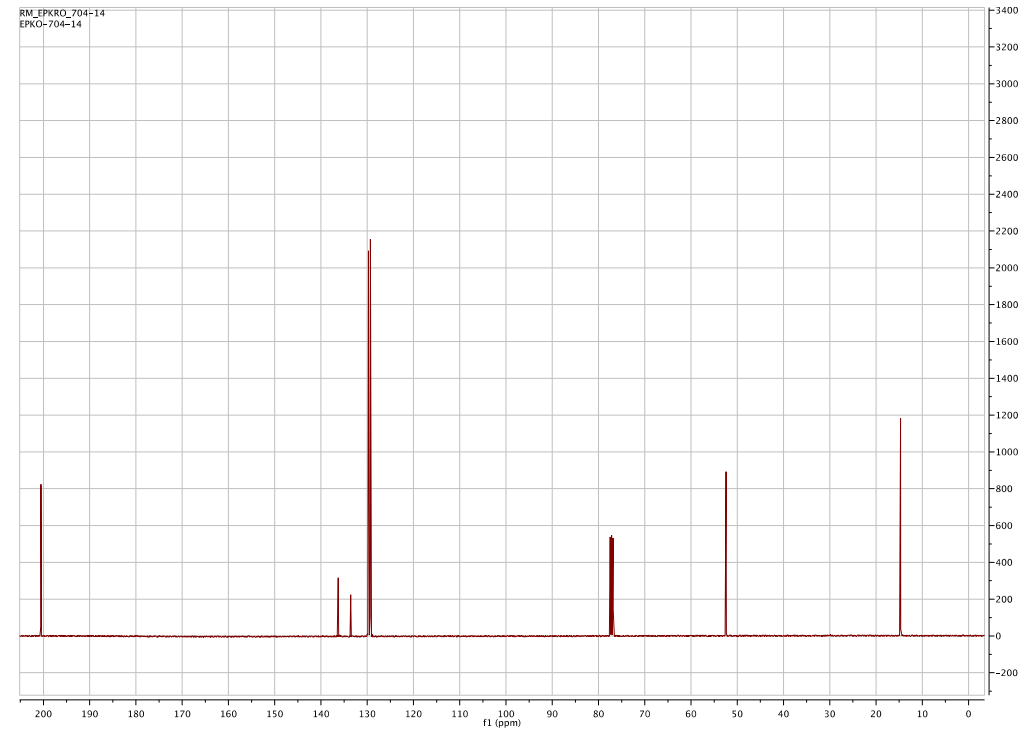




2-(4-Chlorophenyl)propanal





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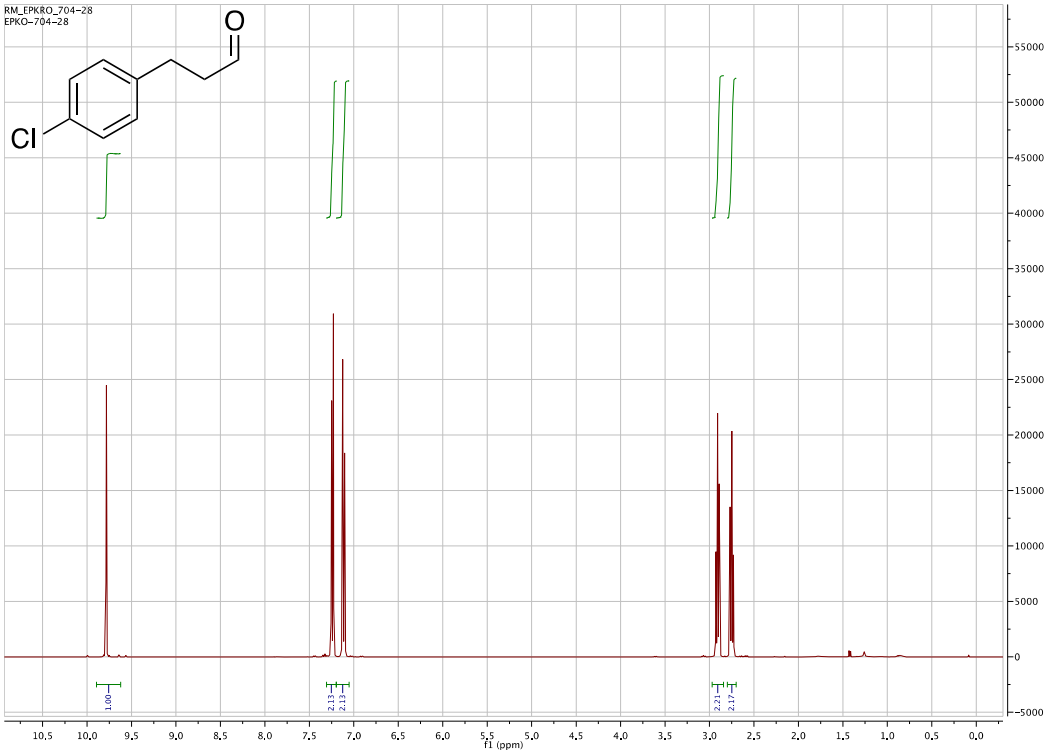
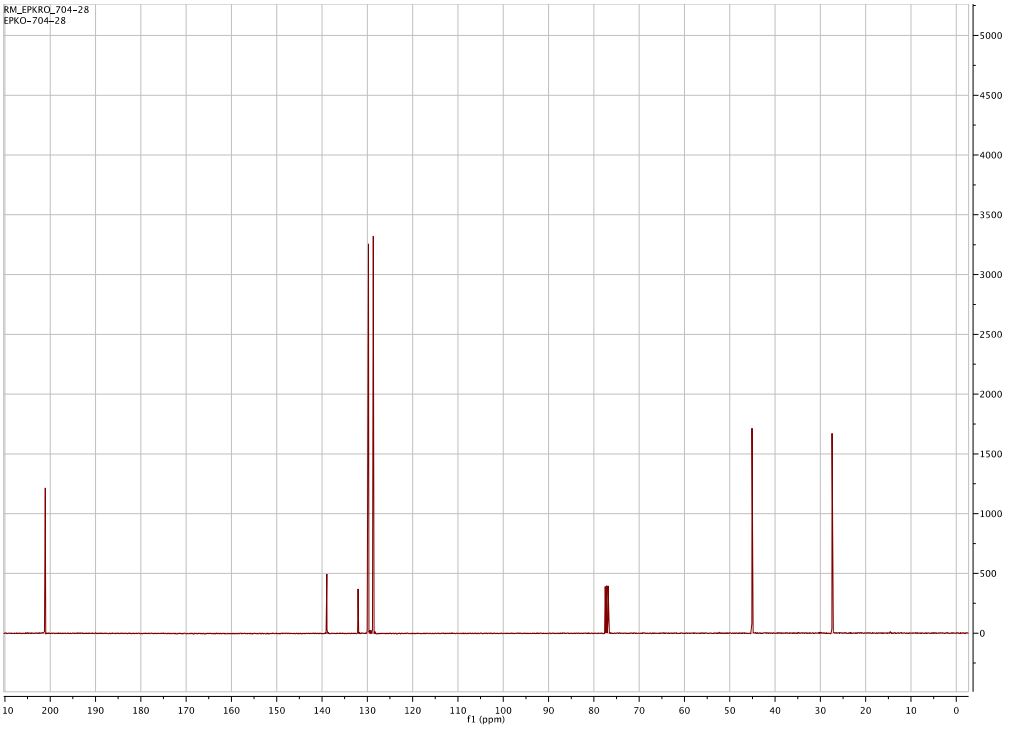
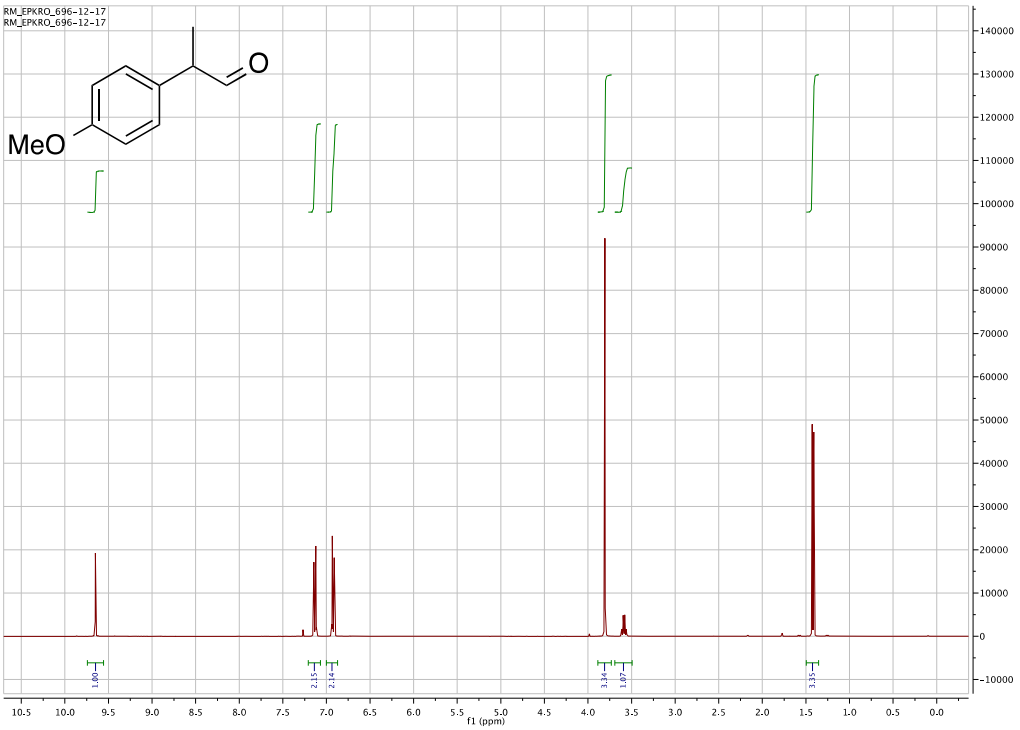
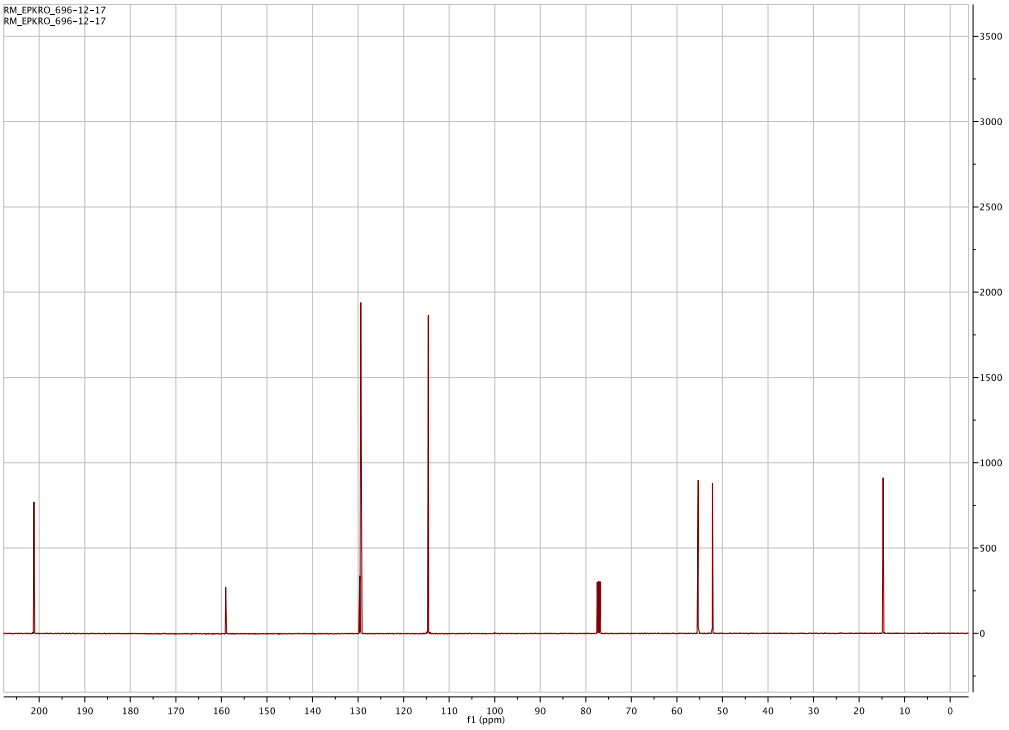


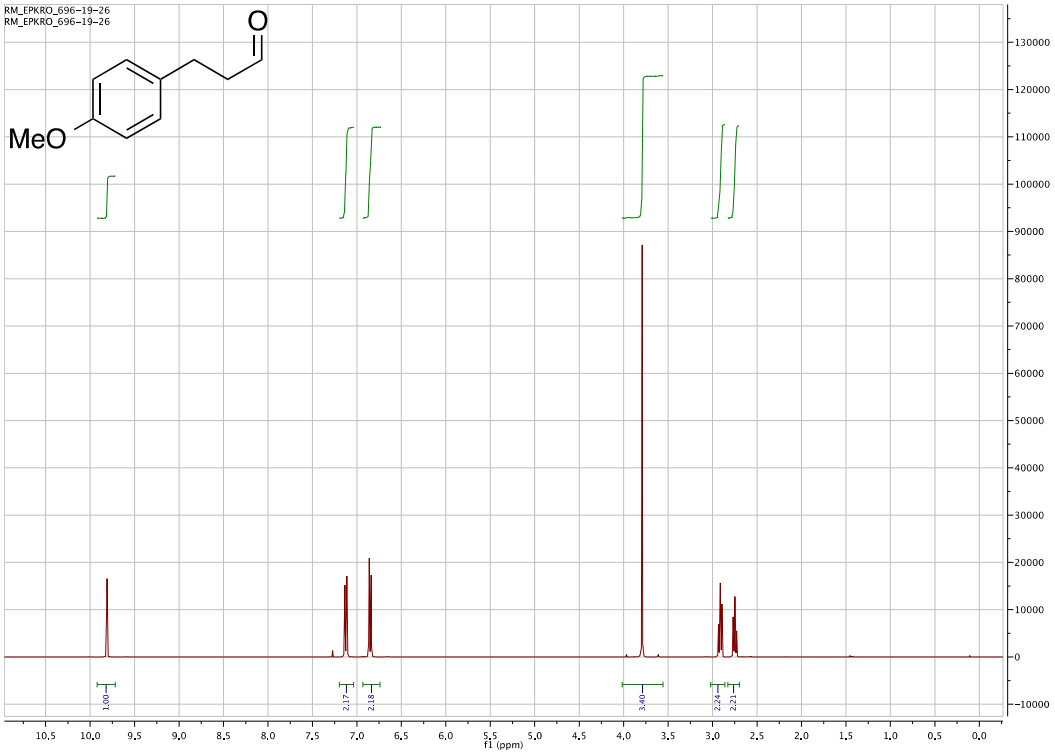


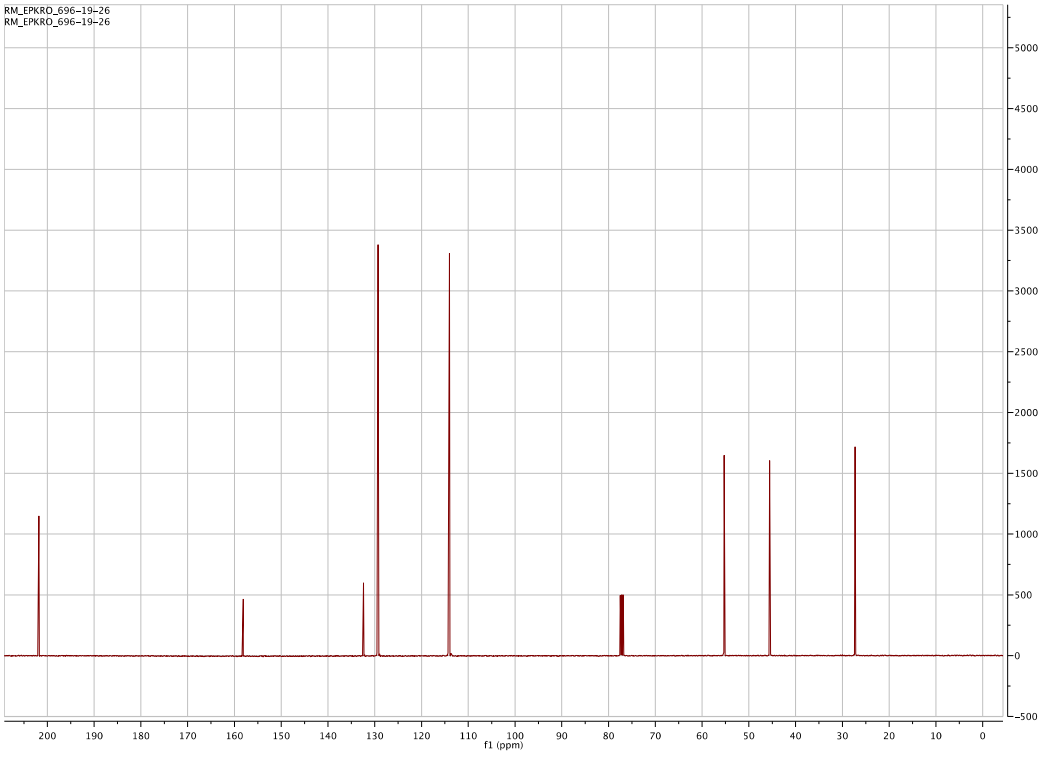
2-(4-Methoxyphenyl)propanal



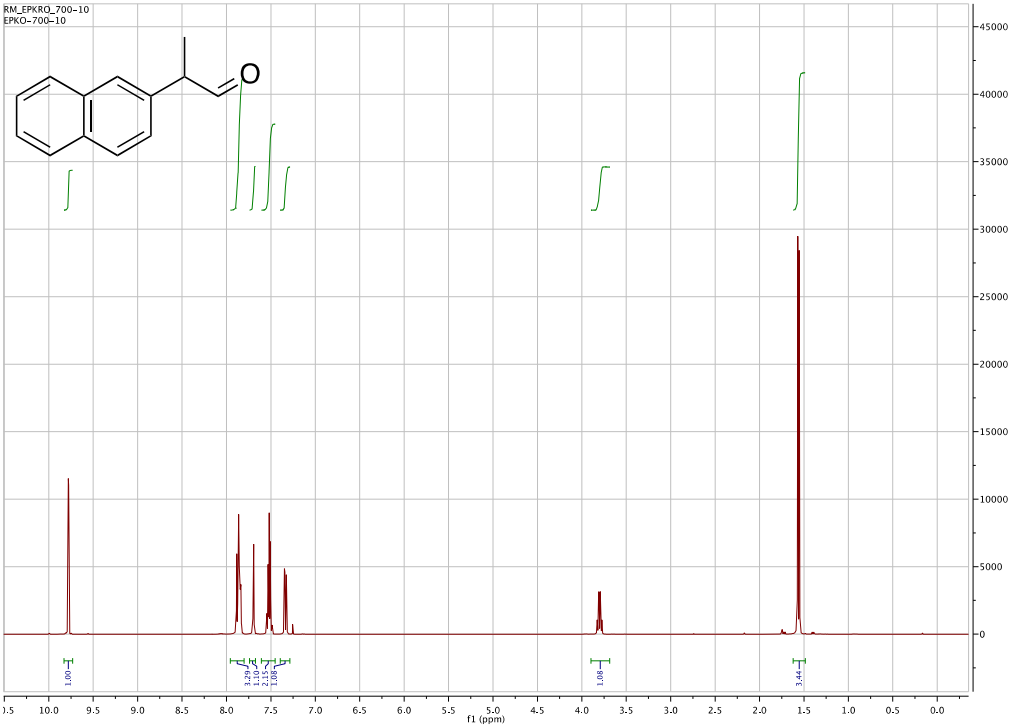


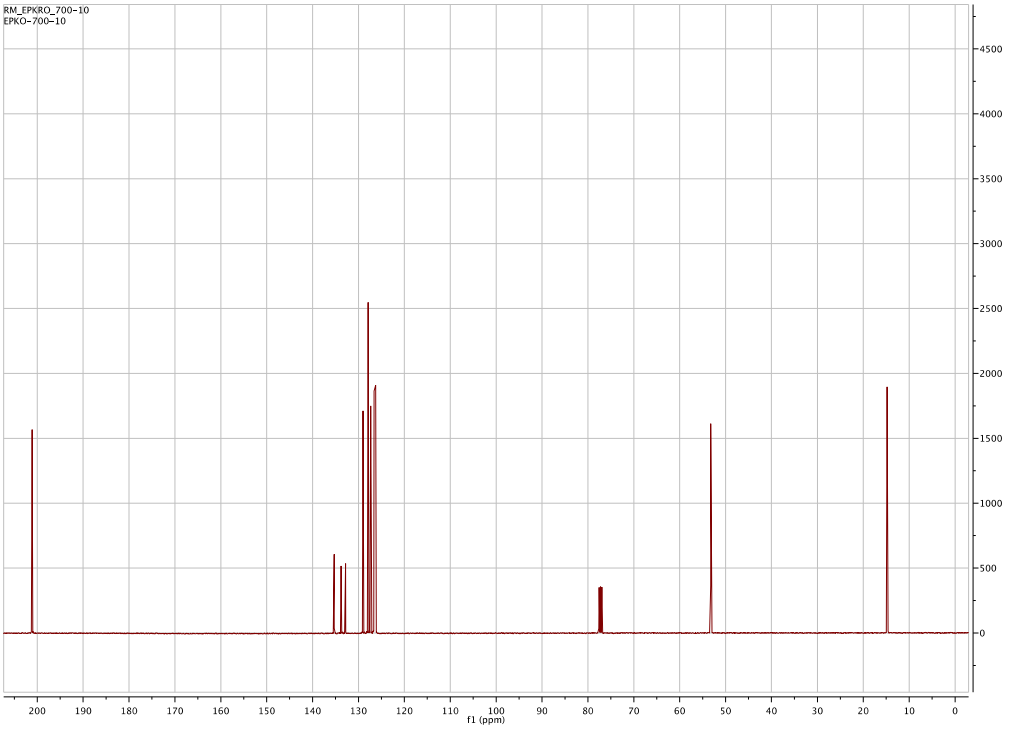
3-(4-Methoxyphenyl)propanal





2-(2-Naphthyl)propanal





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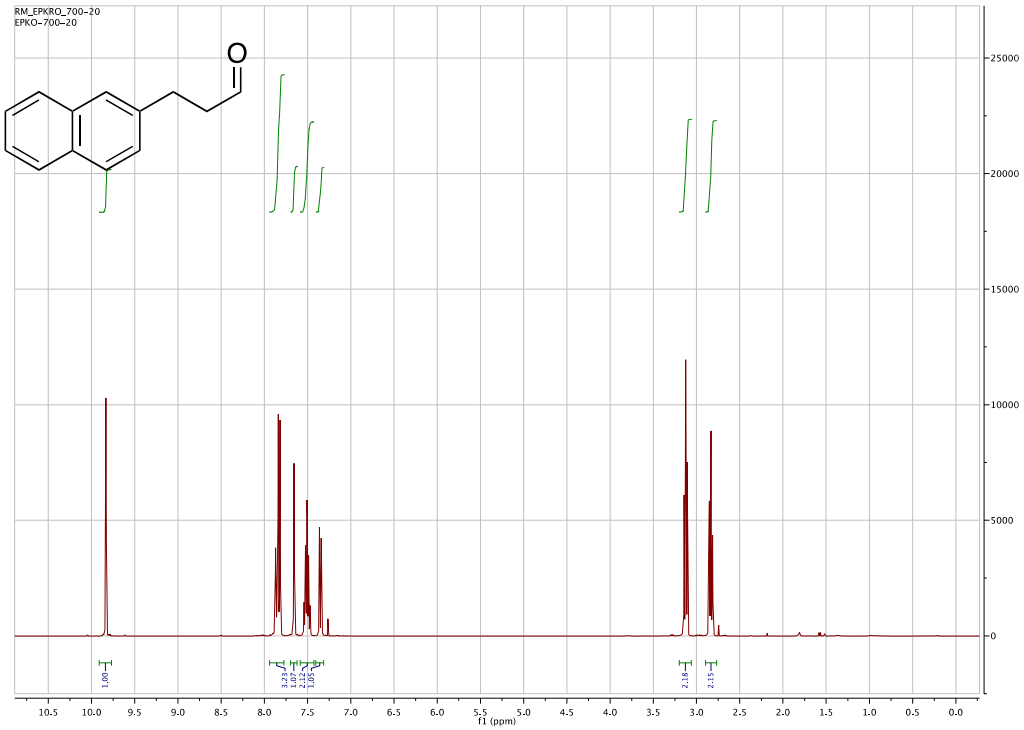
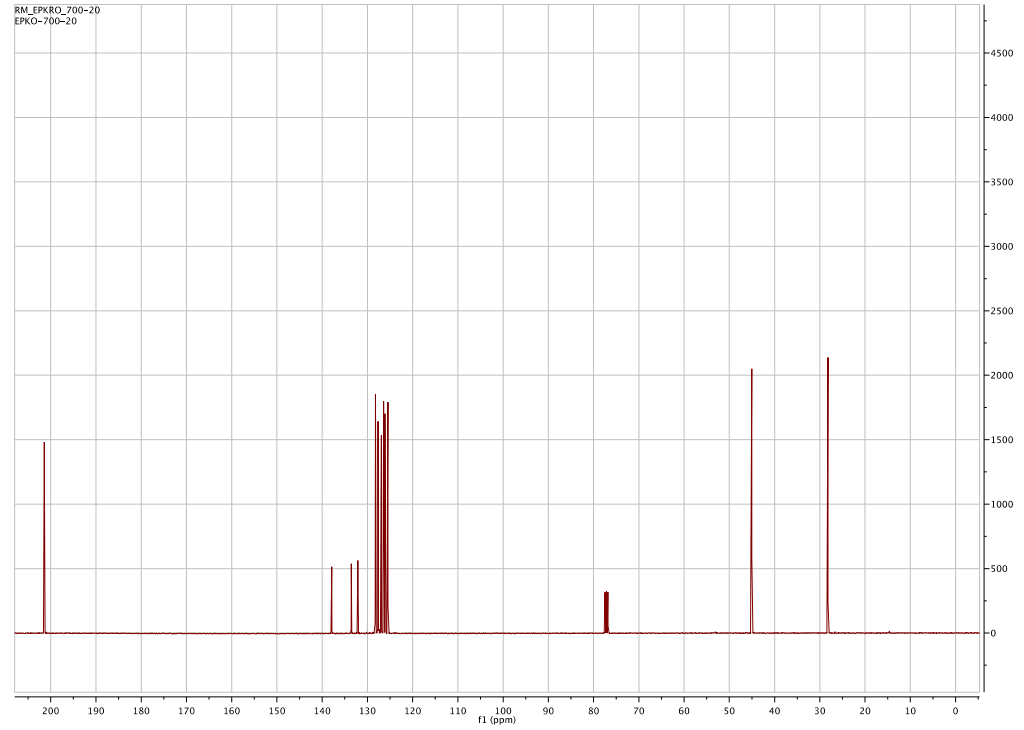
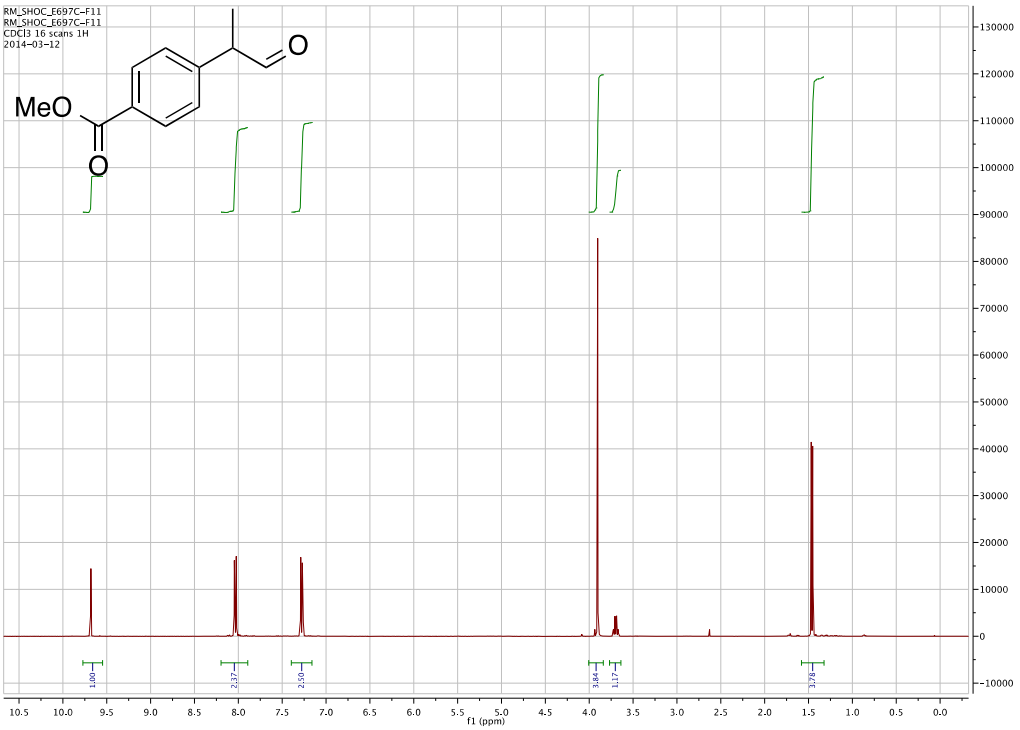
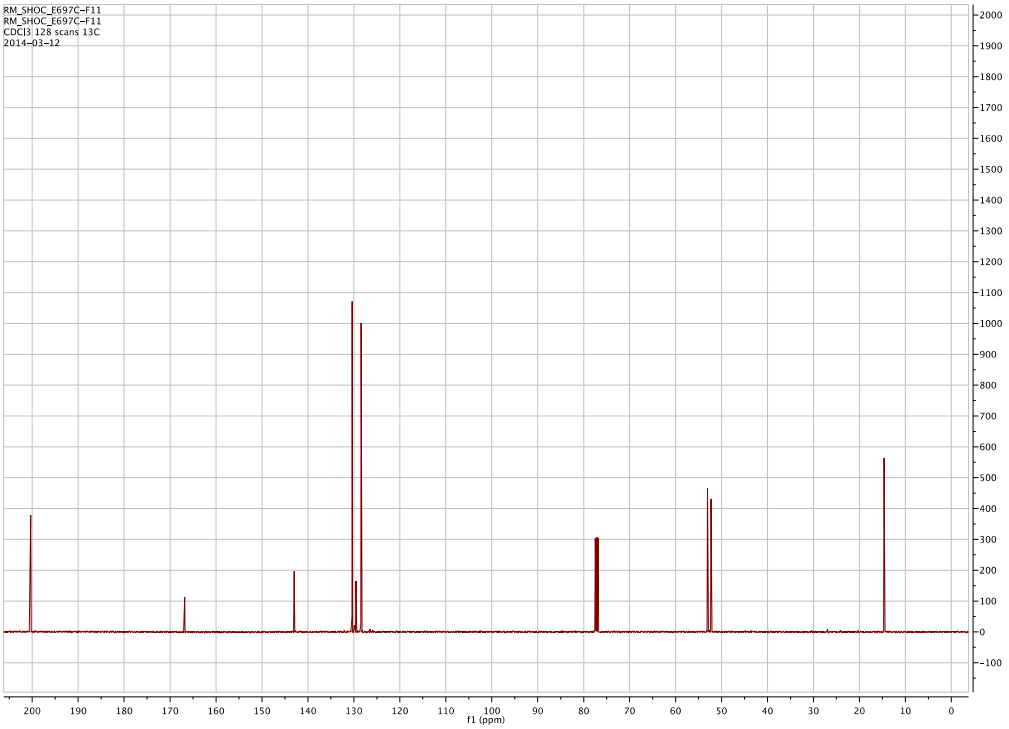


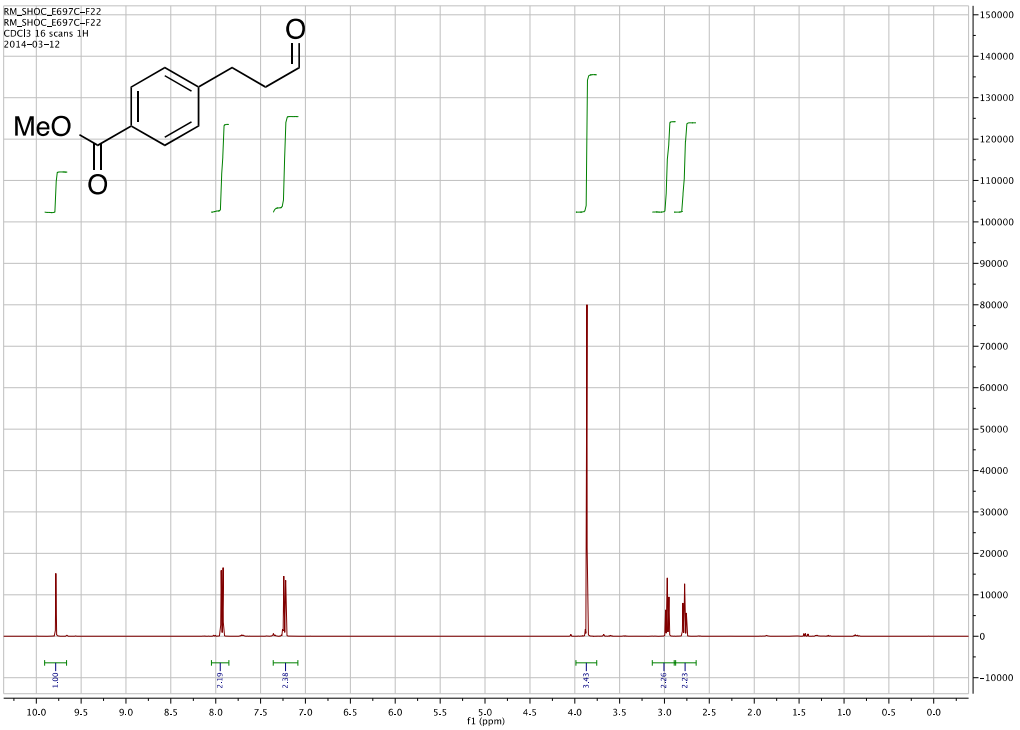


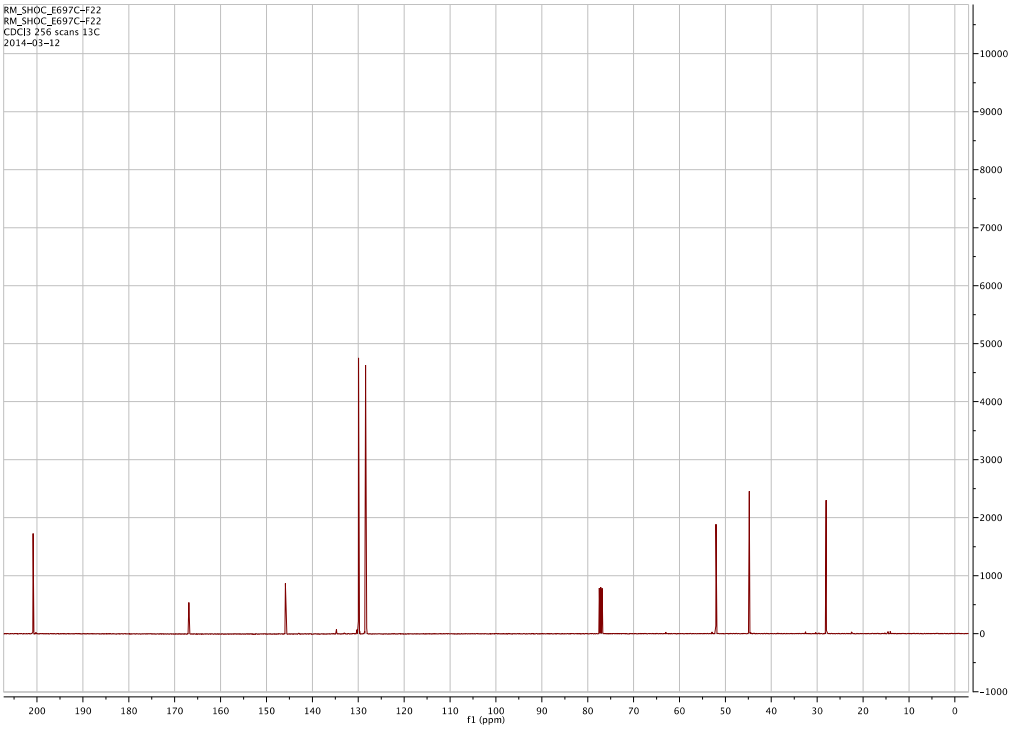
Methyl 4-(1-oxopropan-2-yl)benzoate



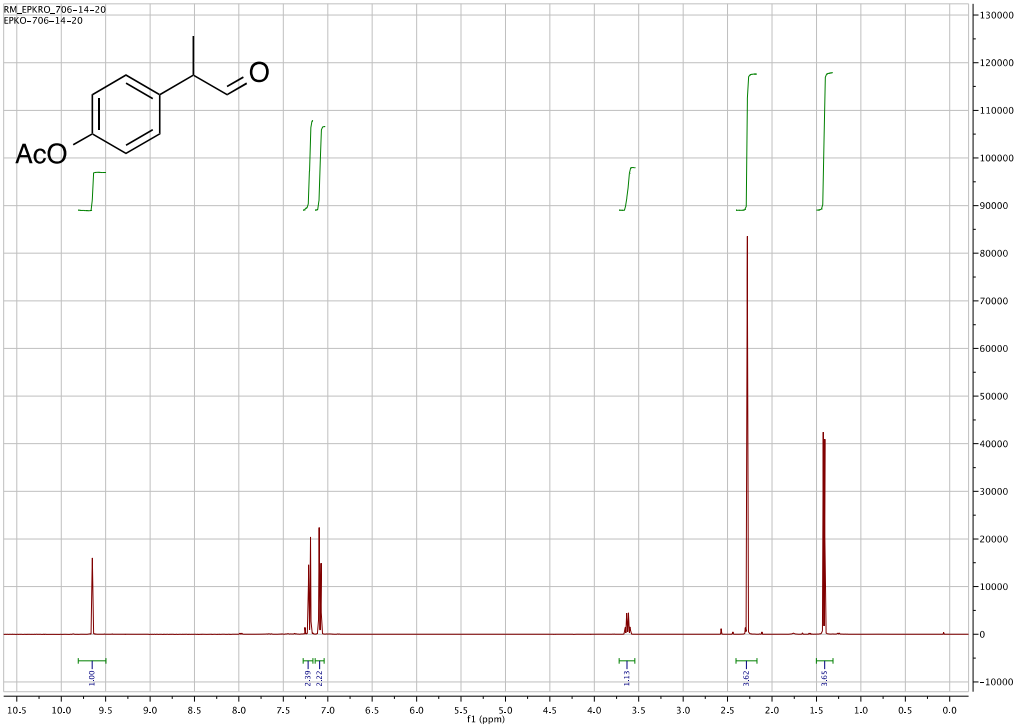


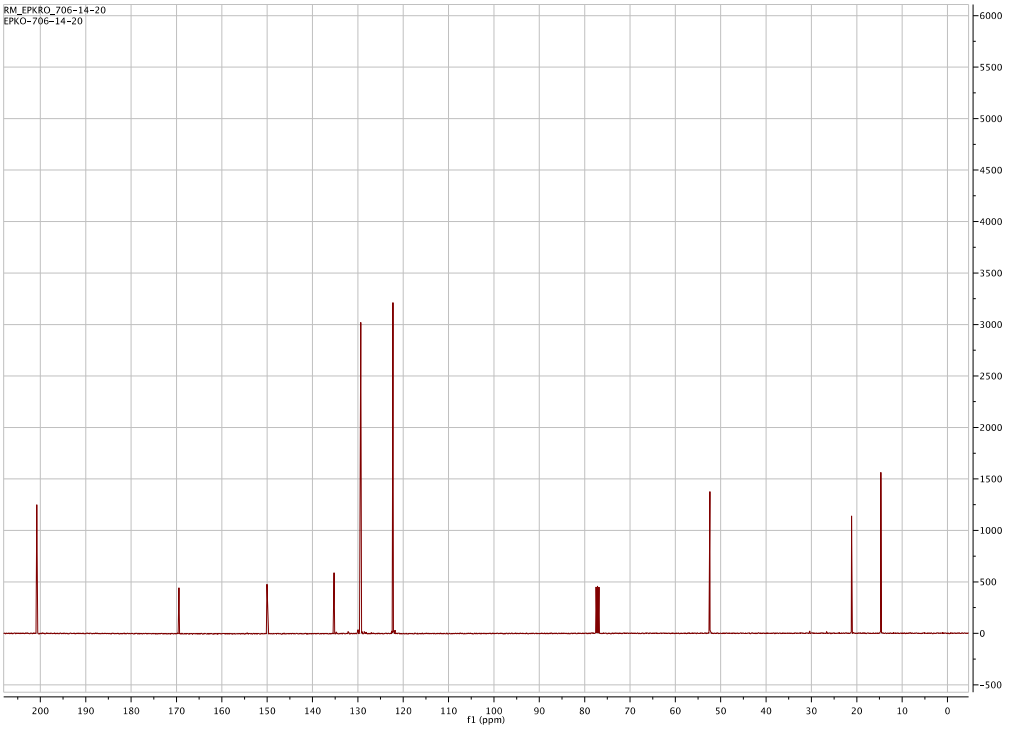
Methyl 4-(3-oxopropyl)benzoate



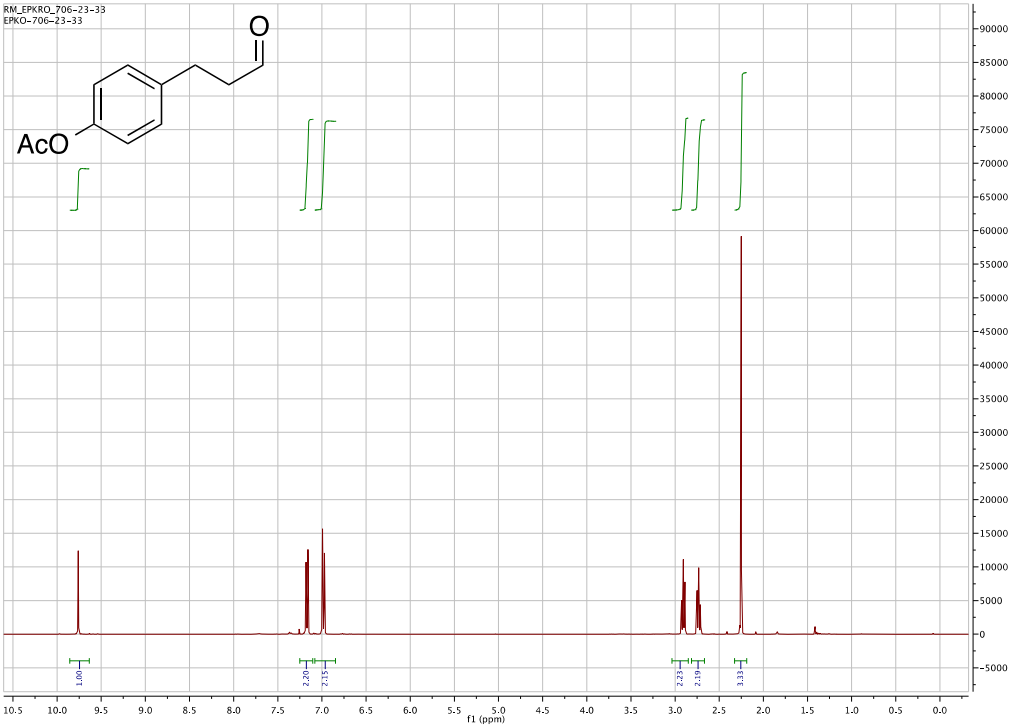


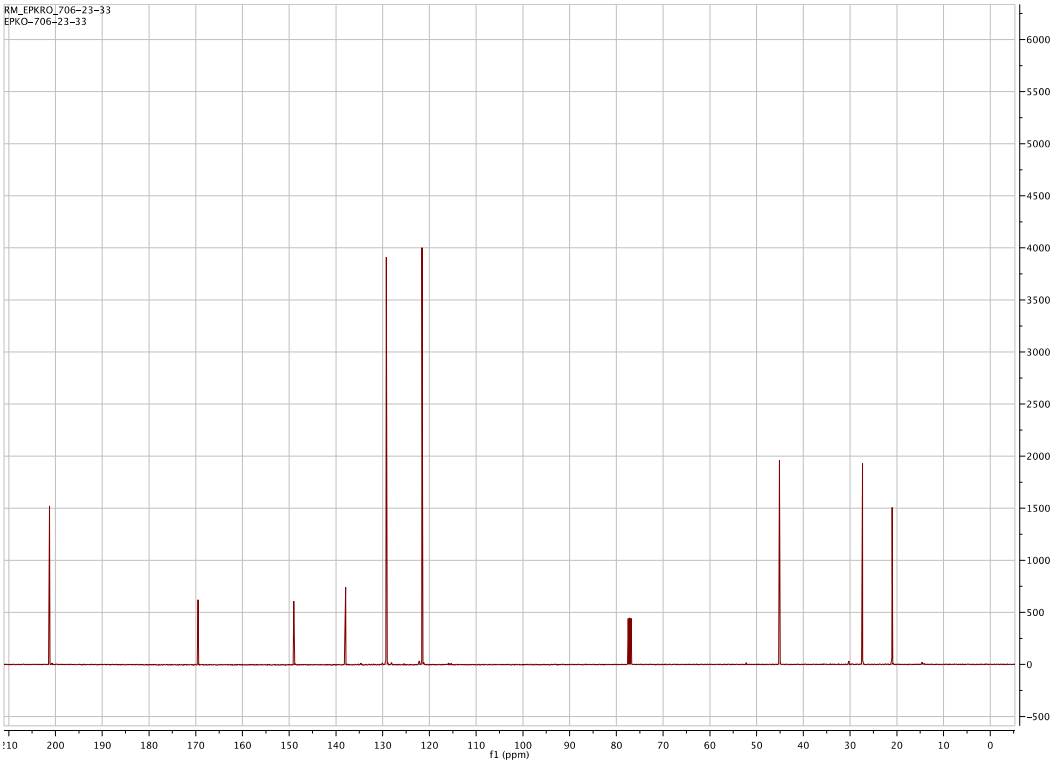
4-(1-Oxopropan-2-yl)phenyl acetate



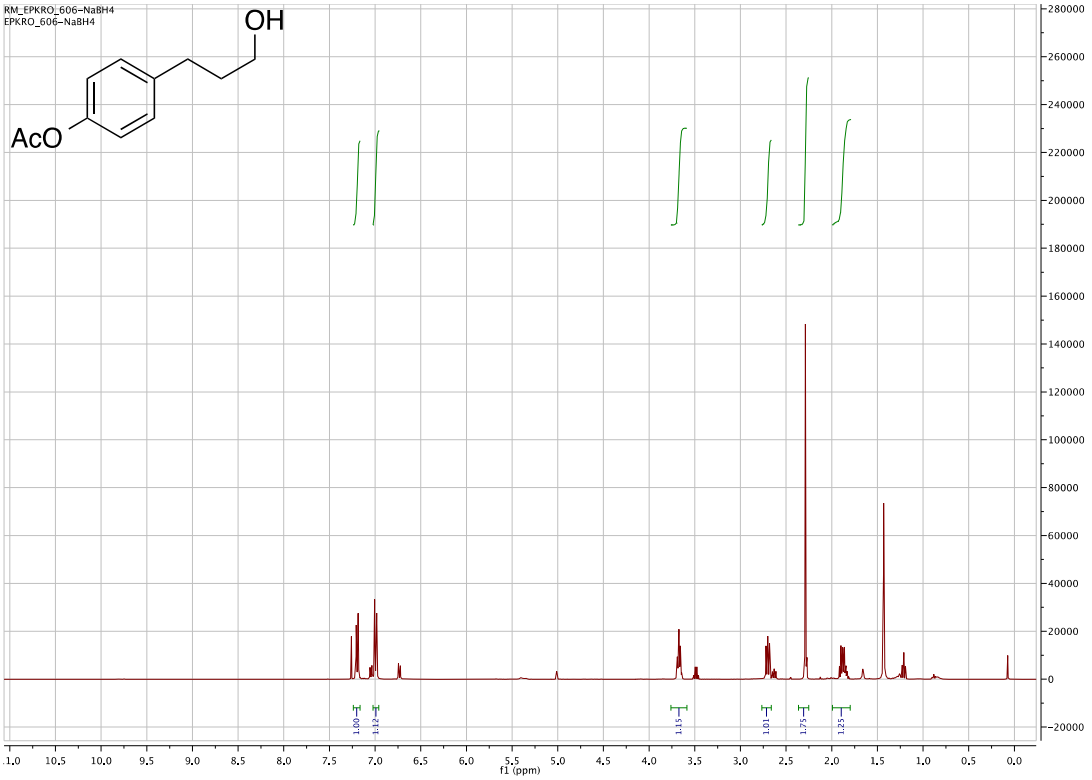


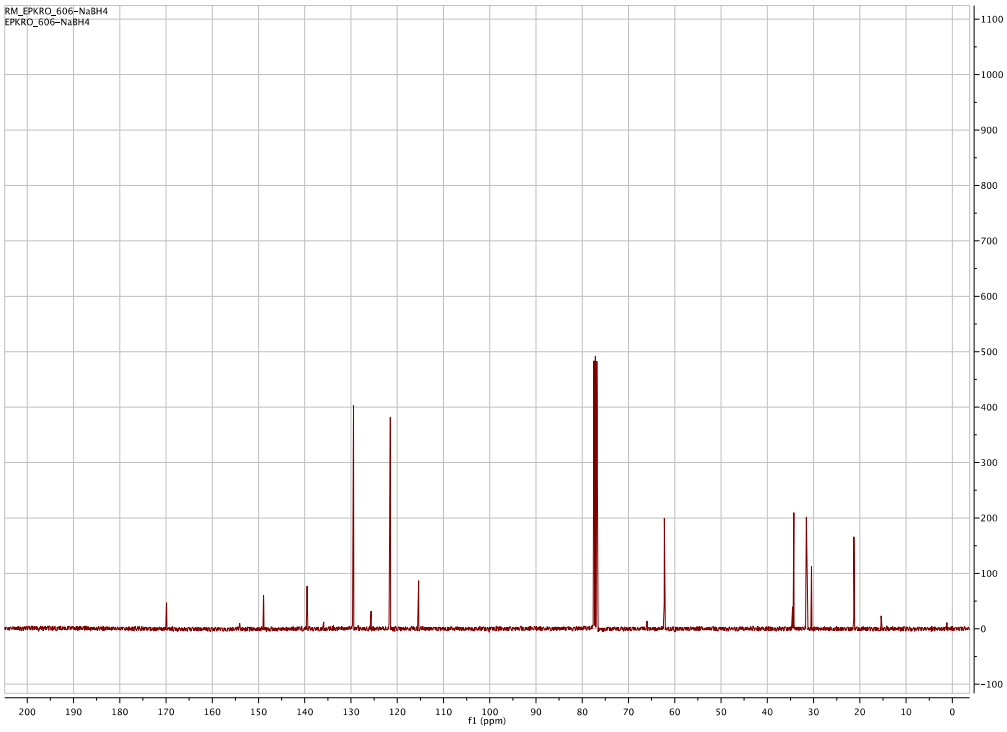
4-(3-Oxopropyl)phenyl acetate



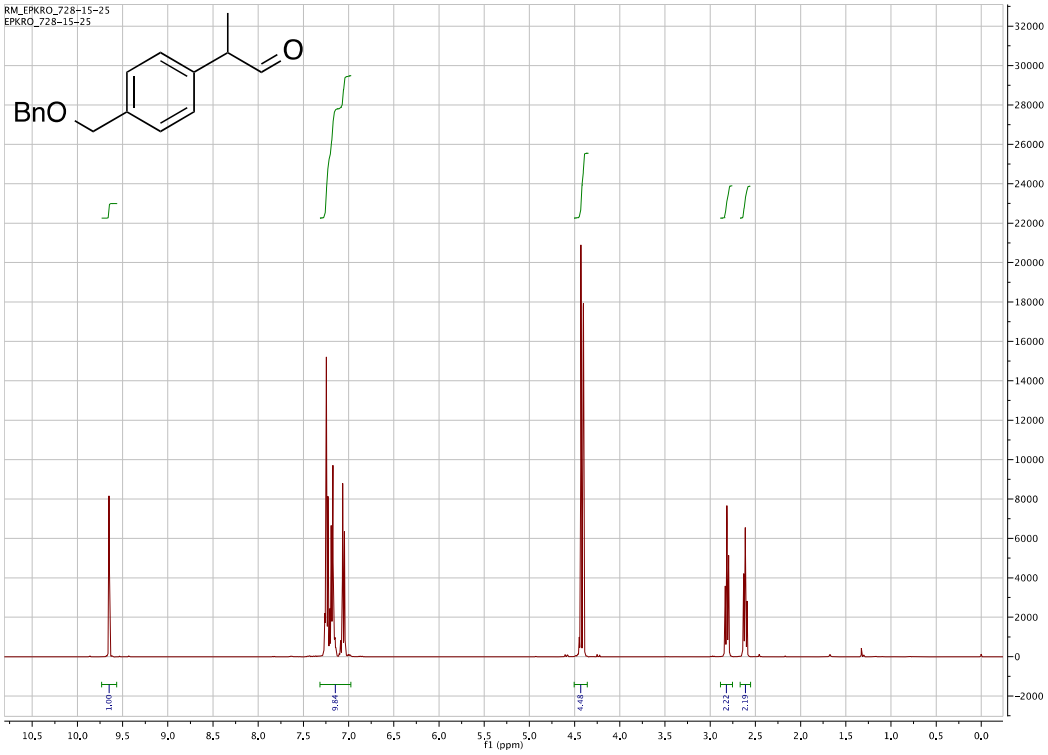


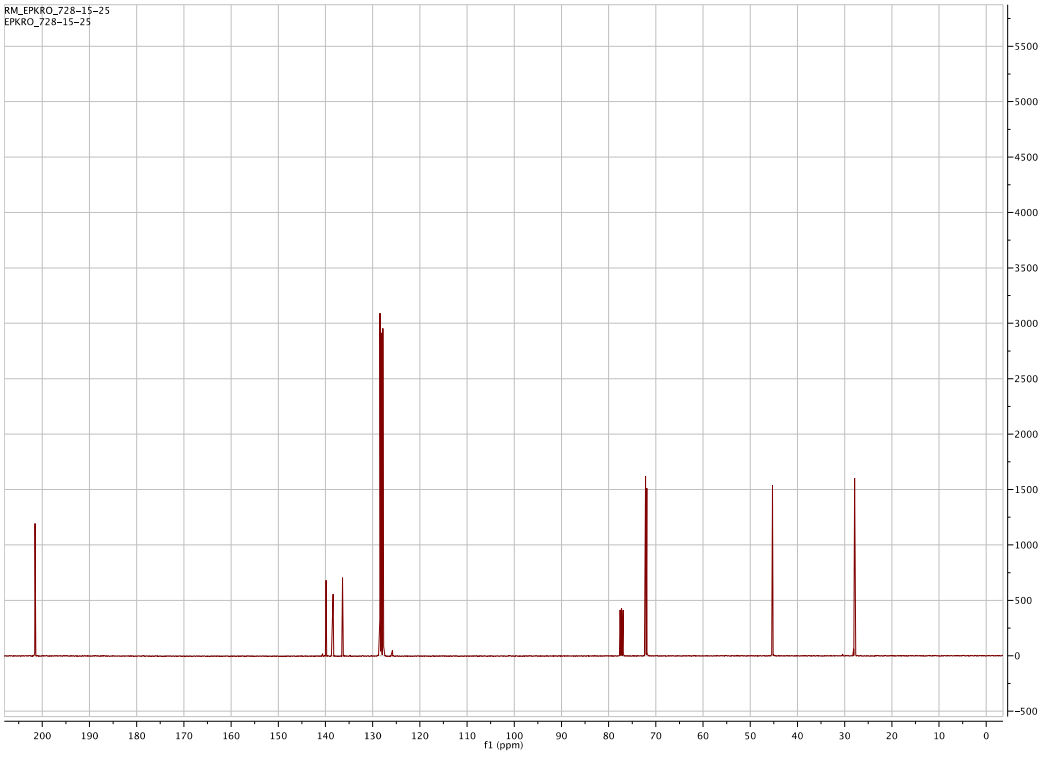
4-(3-Hydroxypropyl)phenyl acetate



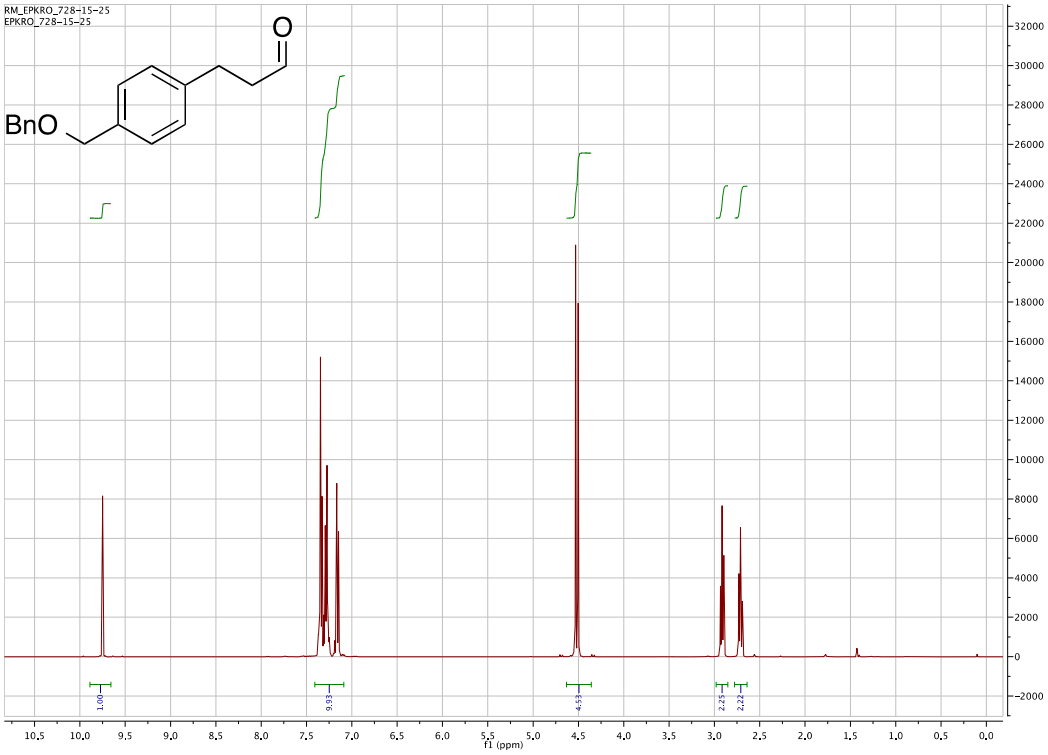


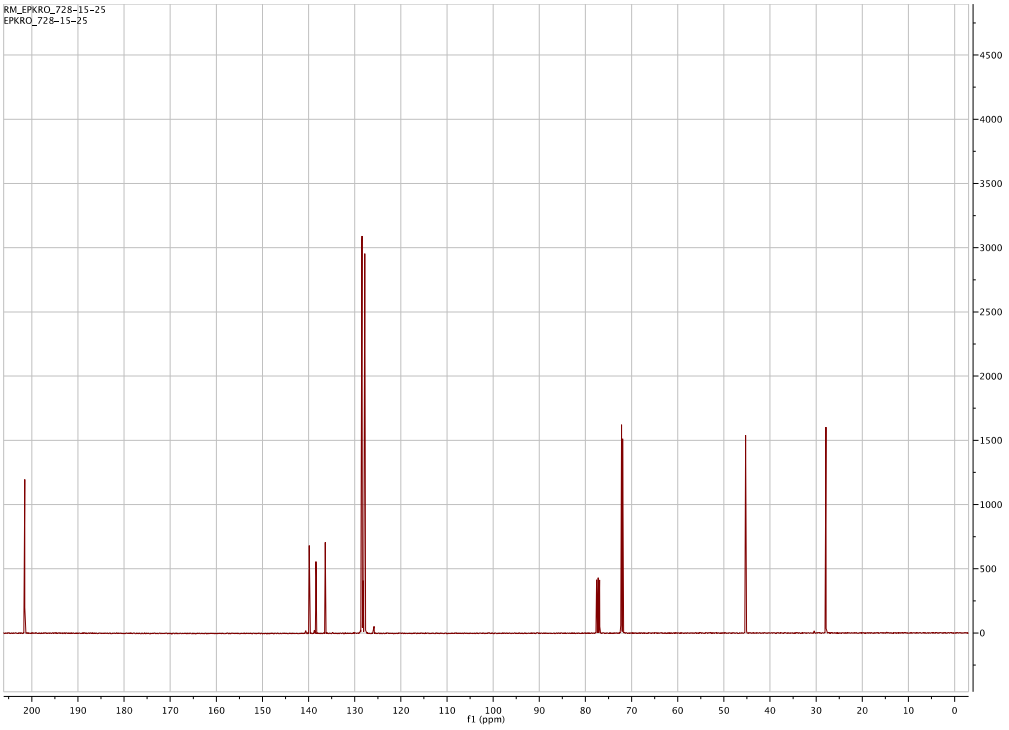
2-(4-(Benzyloxymethyl)phenyl)propanal





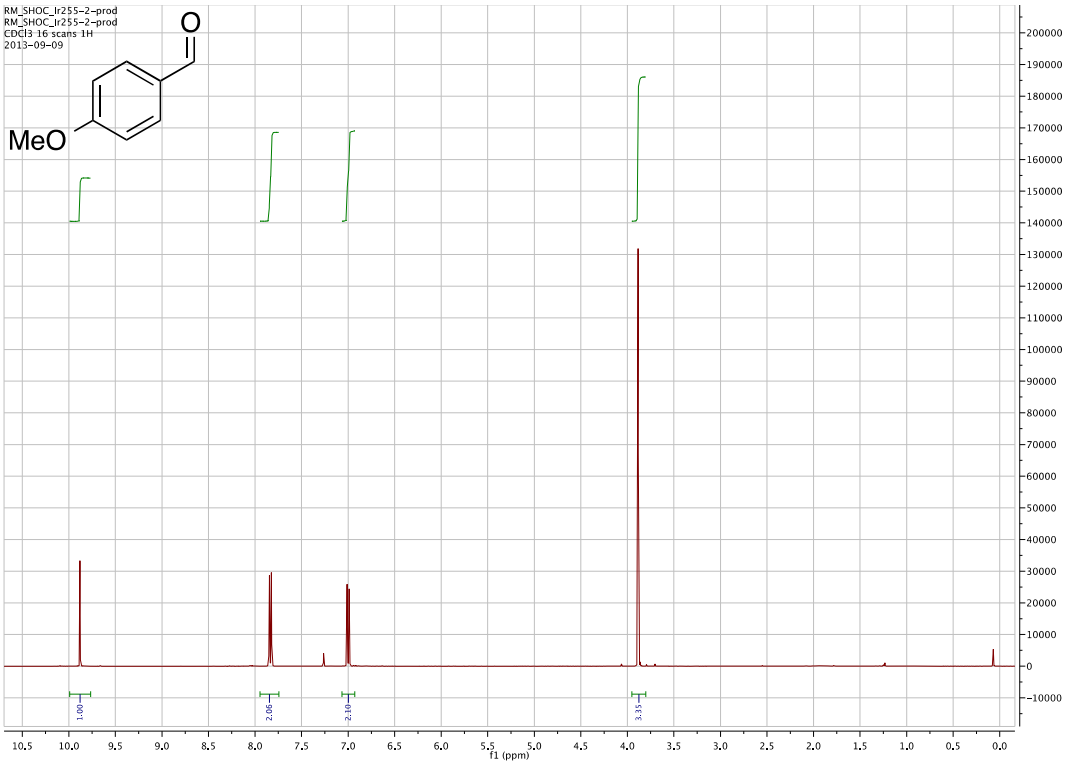
3-(4-(Benzyloxymethyl)phenyl)propanal

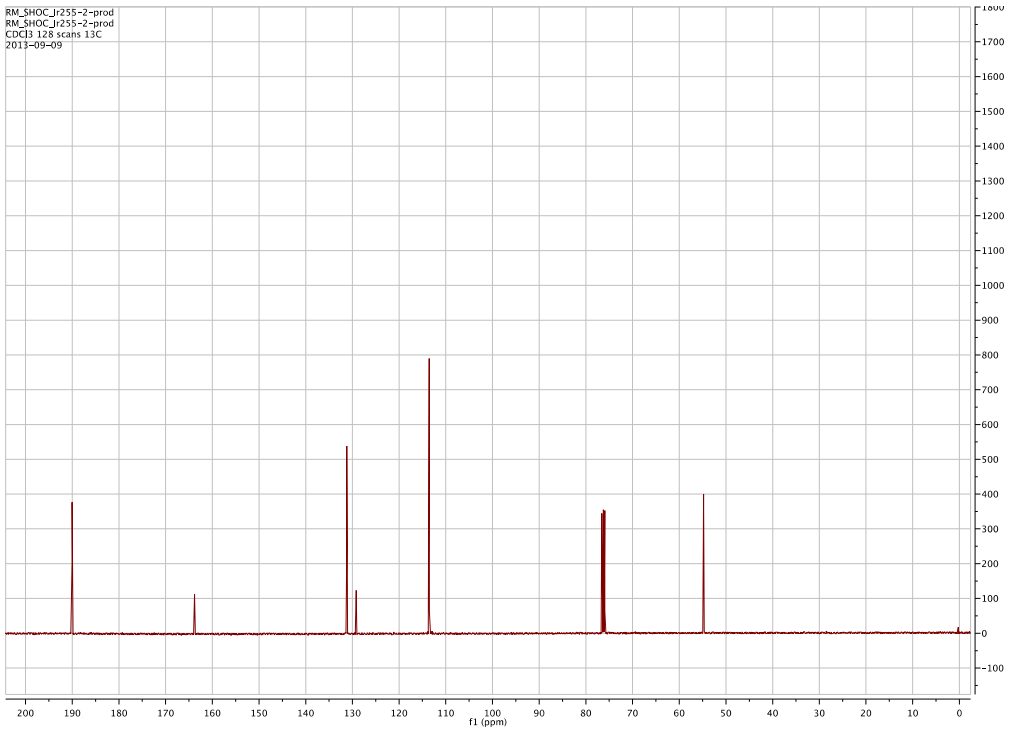




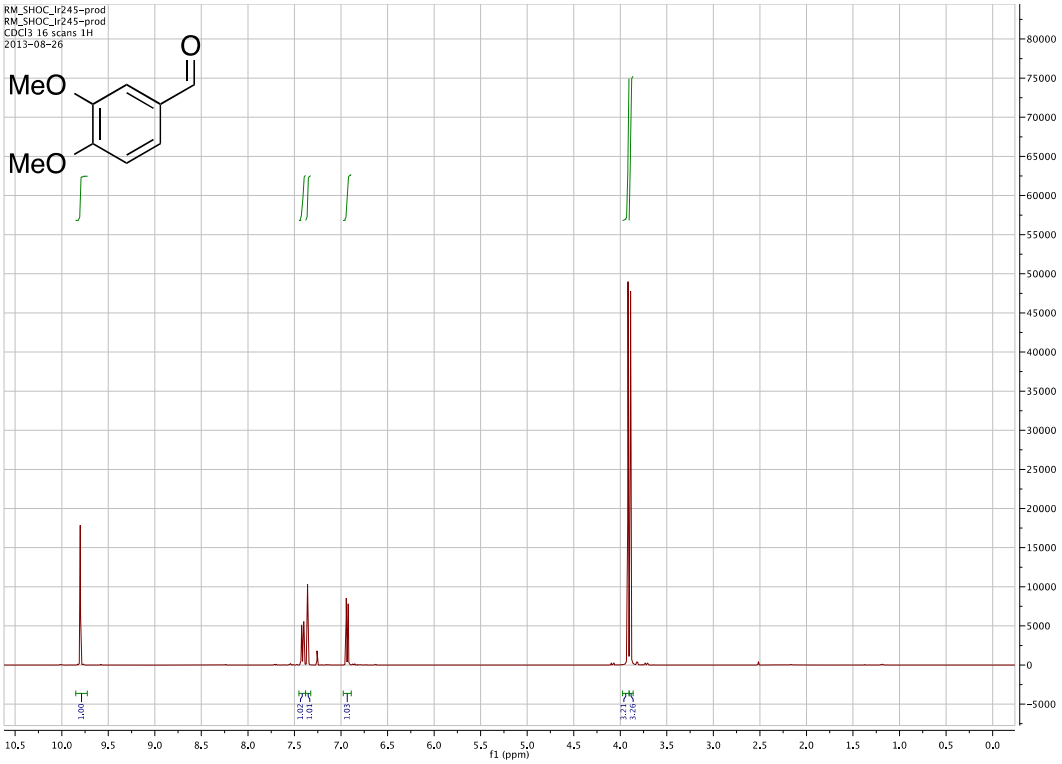
NMR spectra: reductive carbonylation

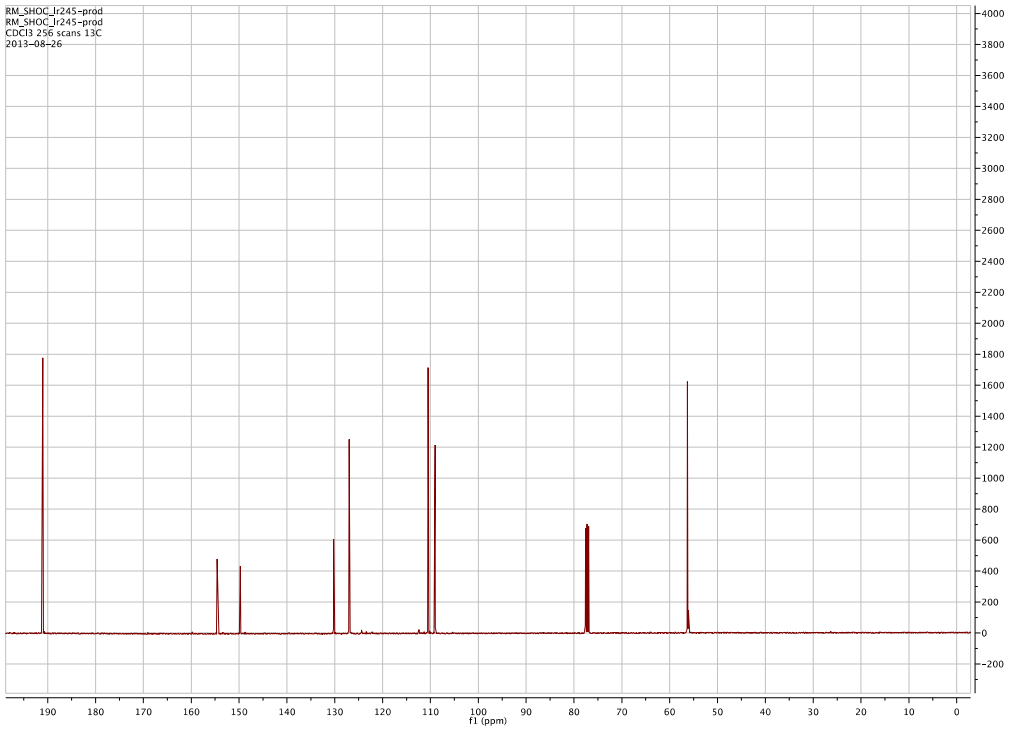
4-Anisaldehyde



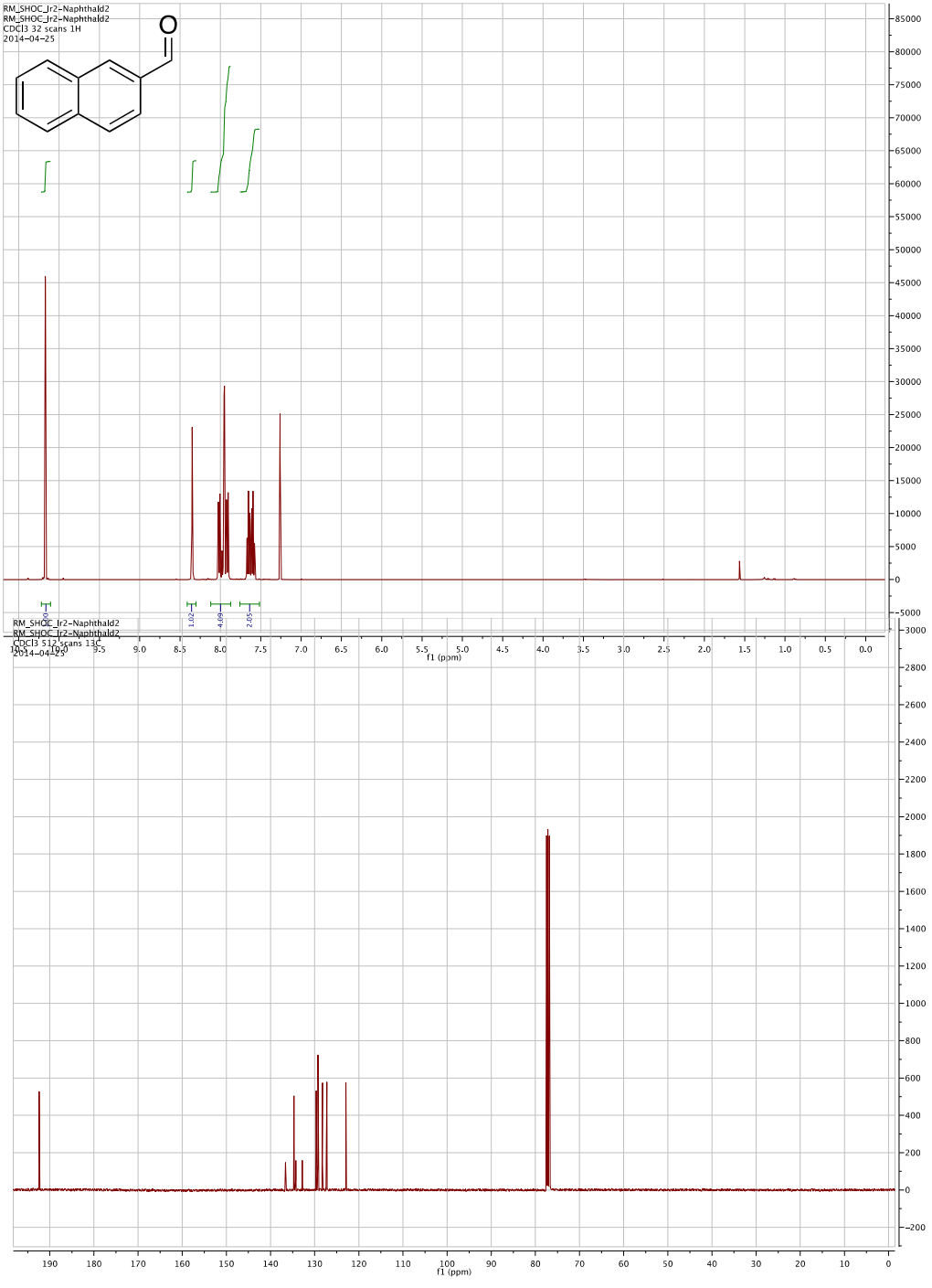


3,4-Dimethoxybenzaldehyde

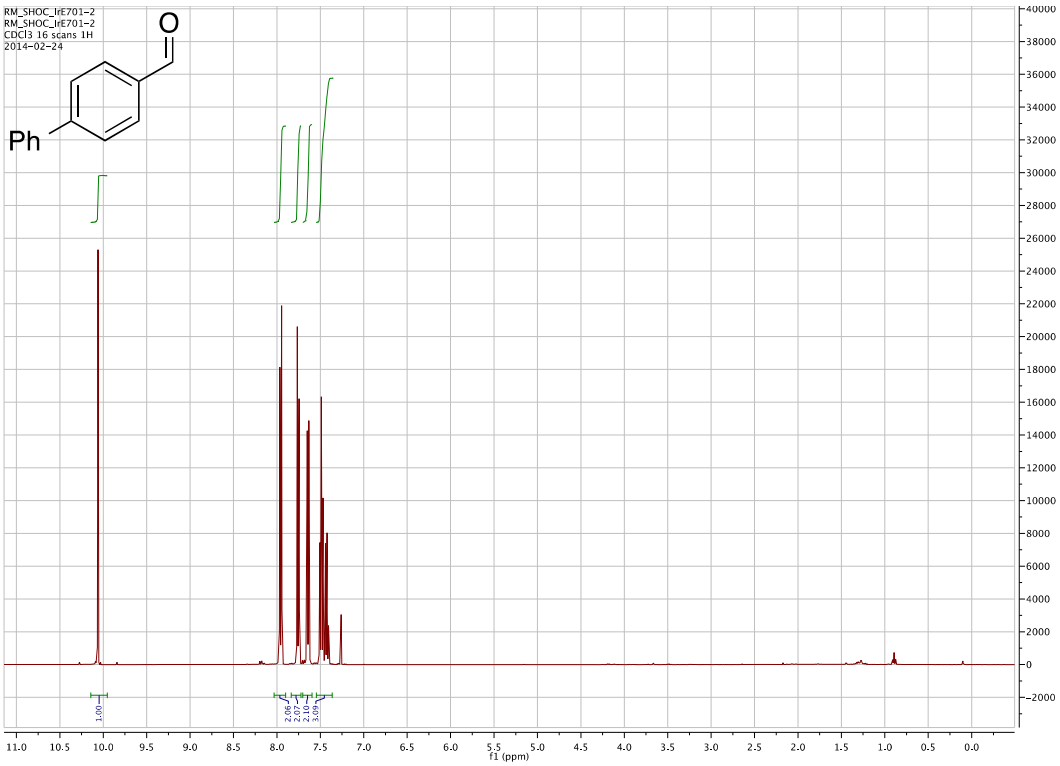


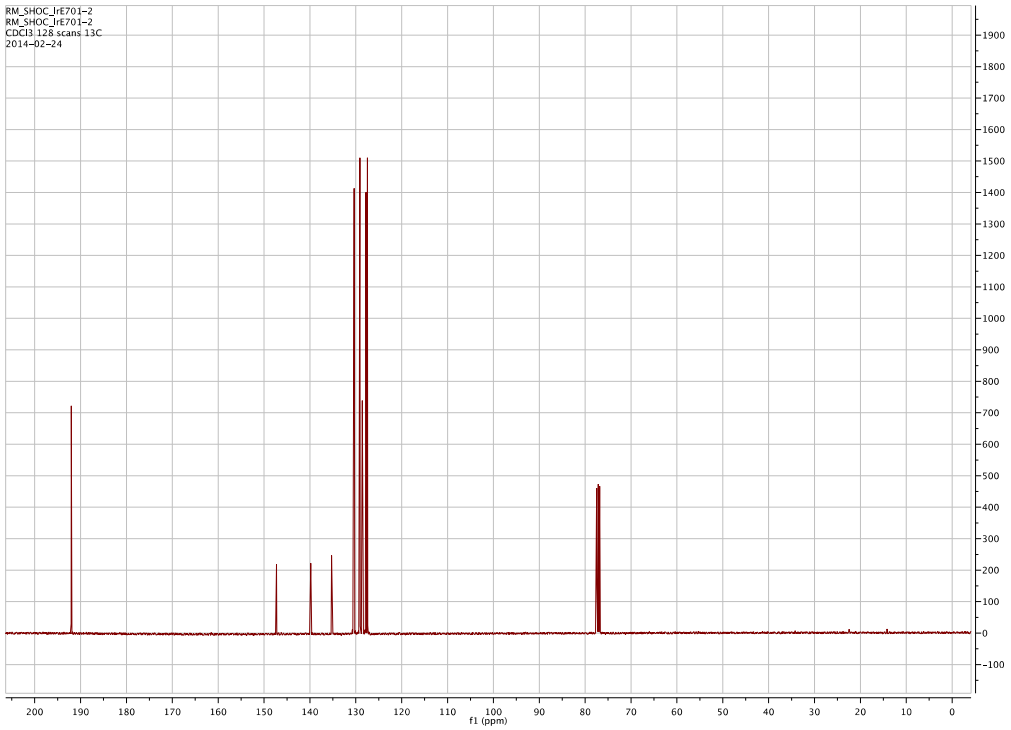


Naphthalene-2-carbaldehyde

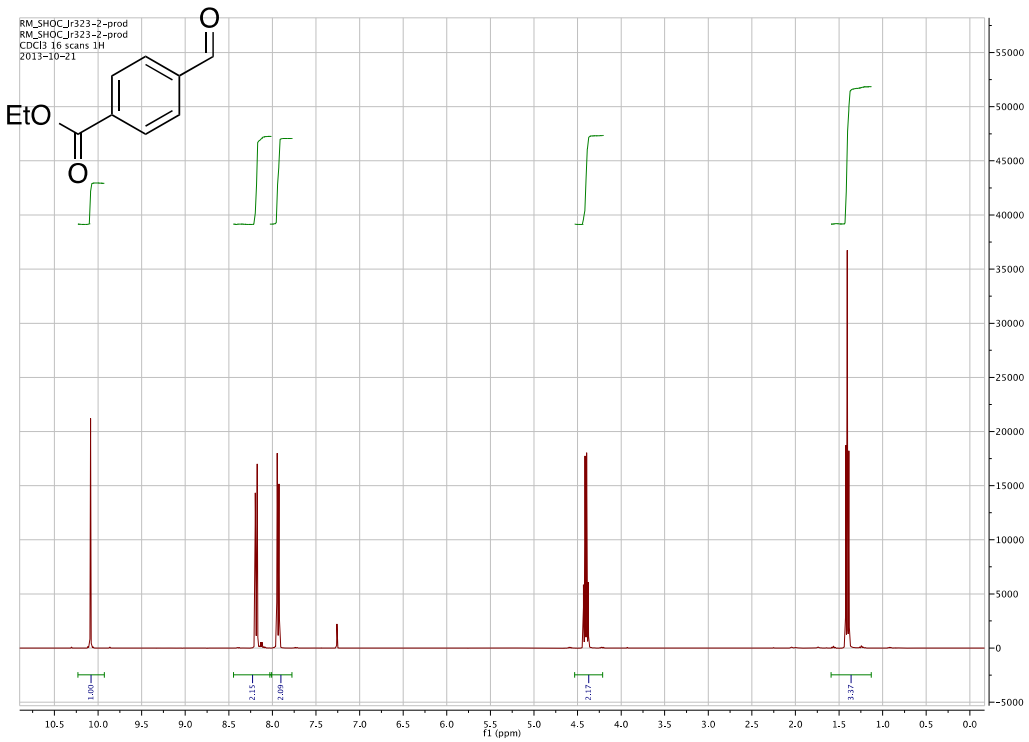


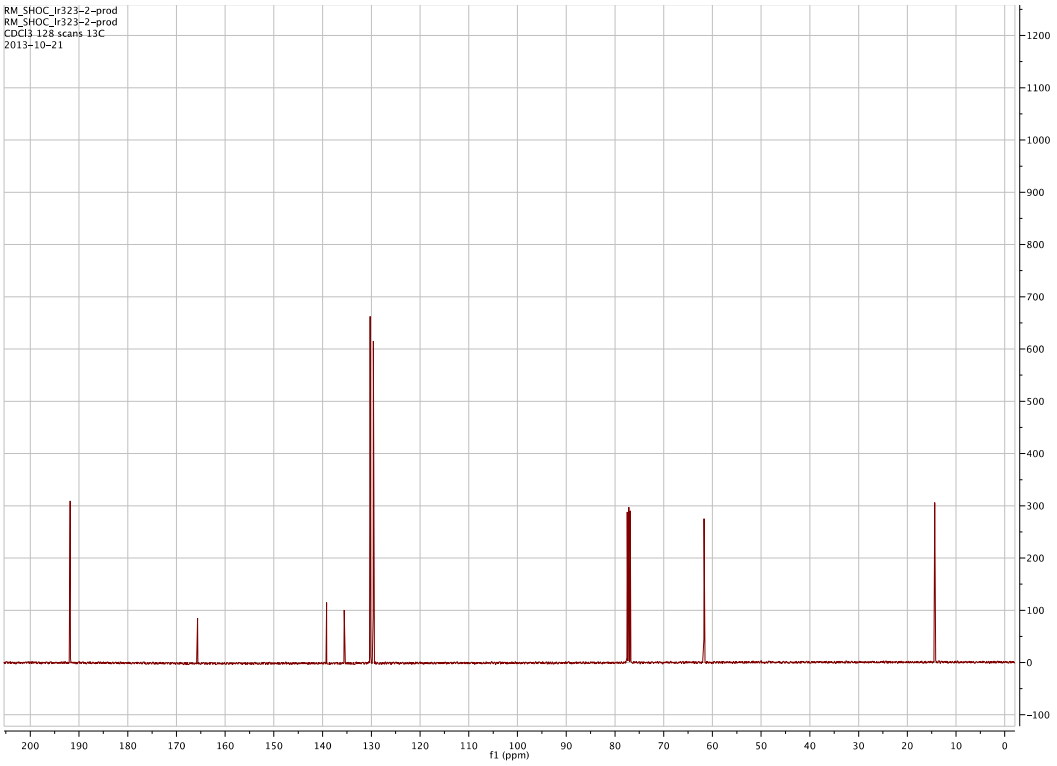
Biphenyl-4-carbaldehyde



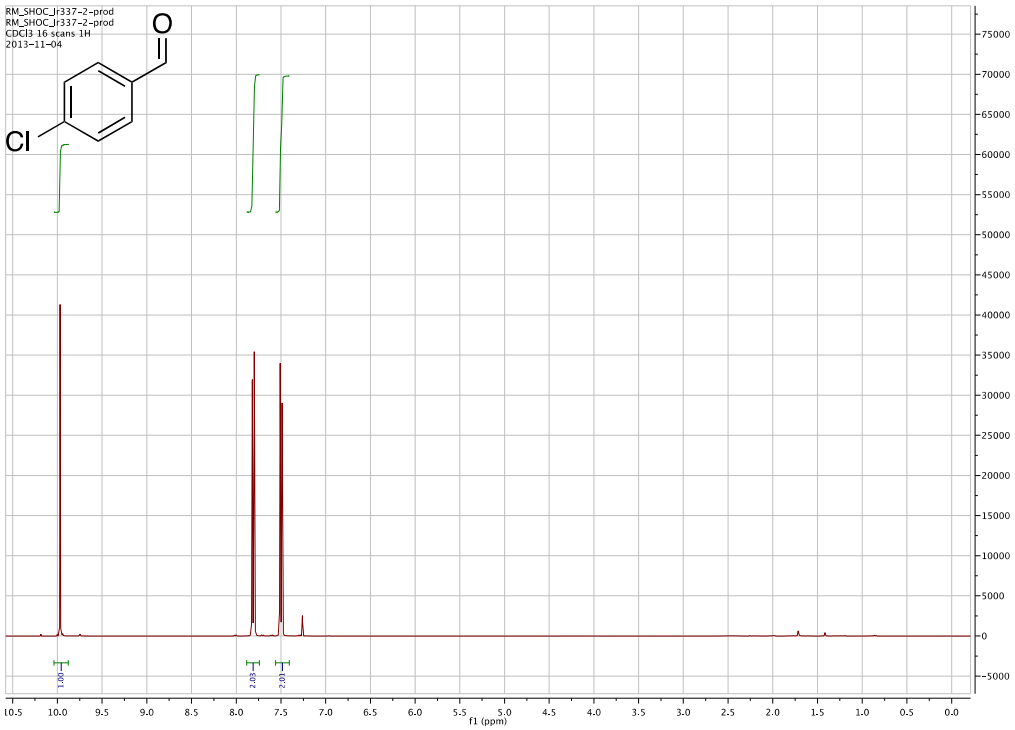


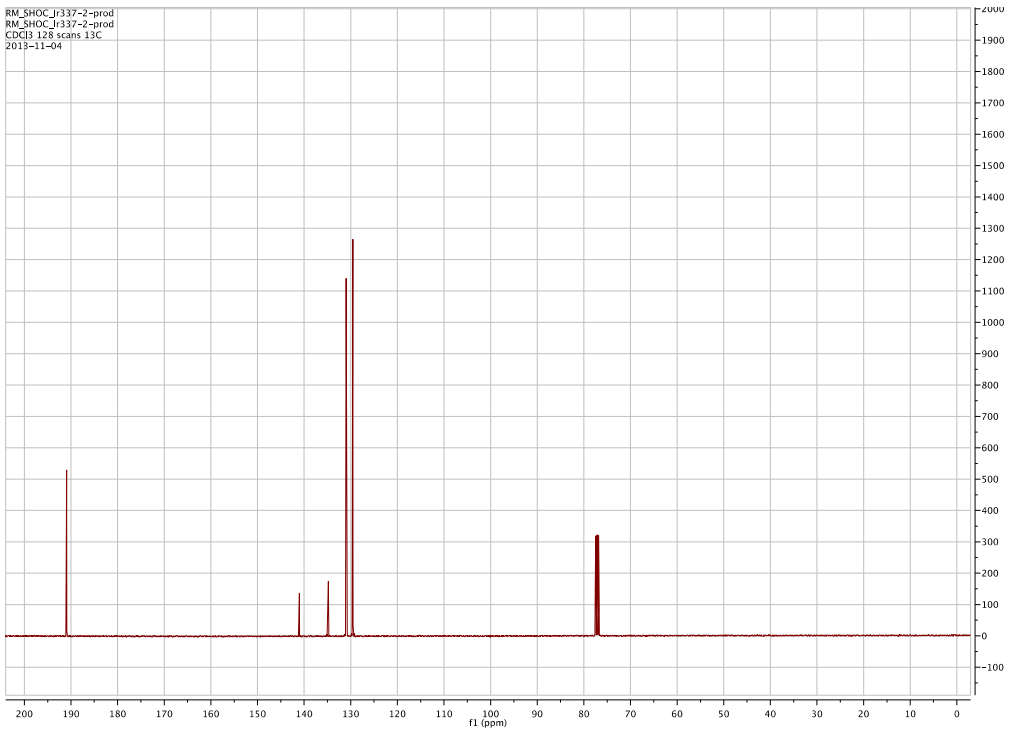
Ethyl 4-formylbenzoate



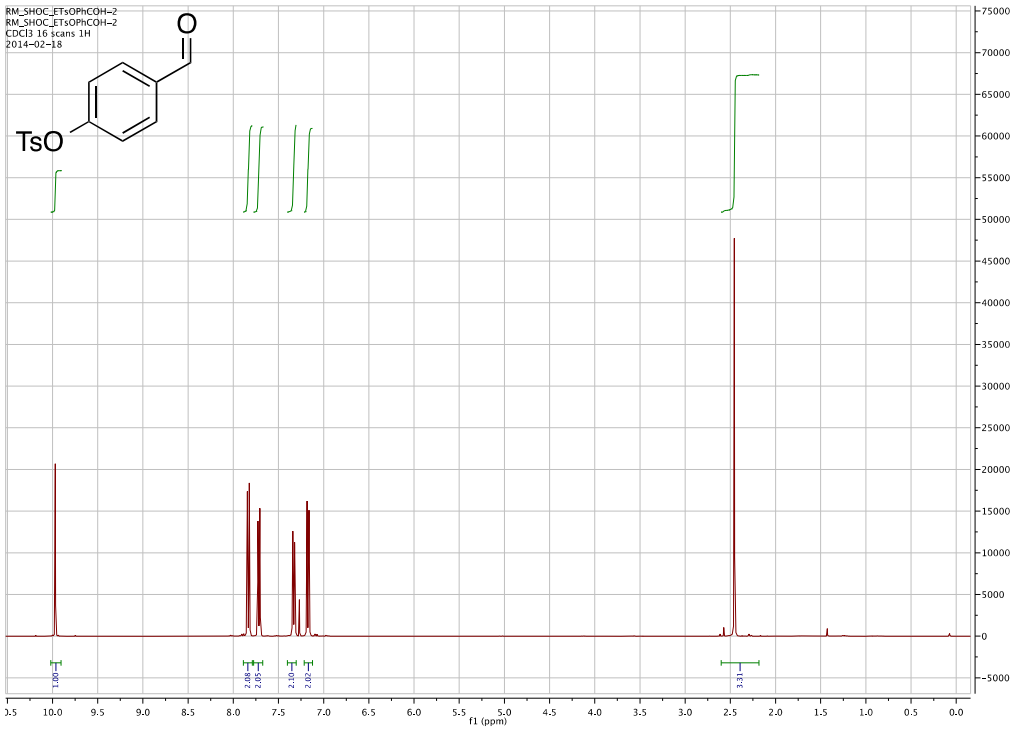


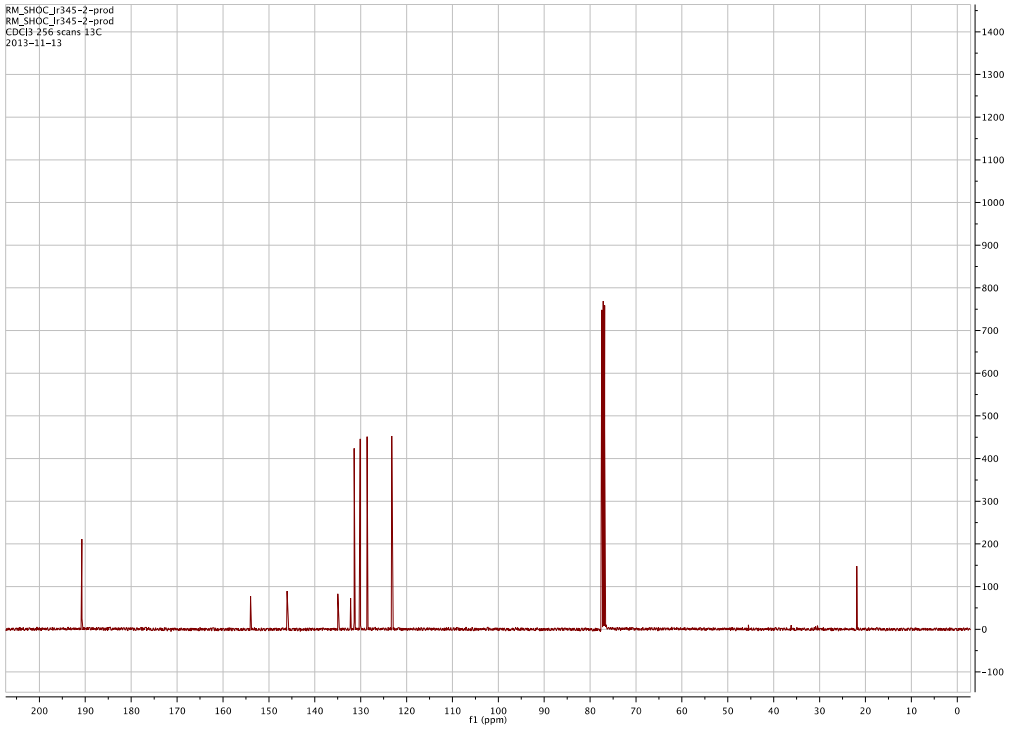
4-Chlorobenzaldehyde



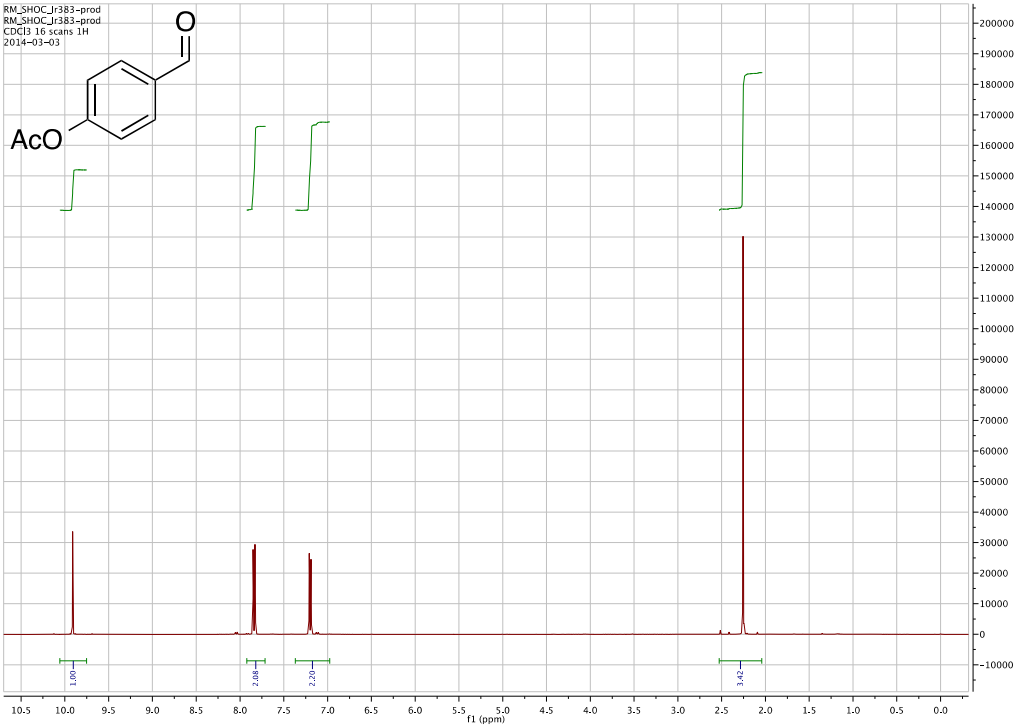


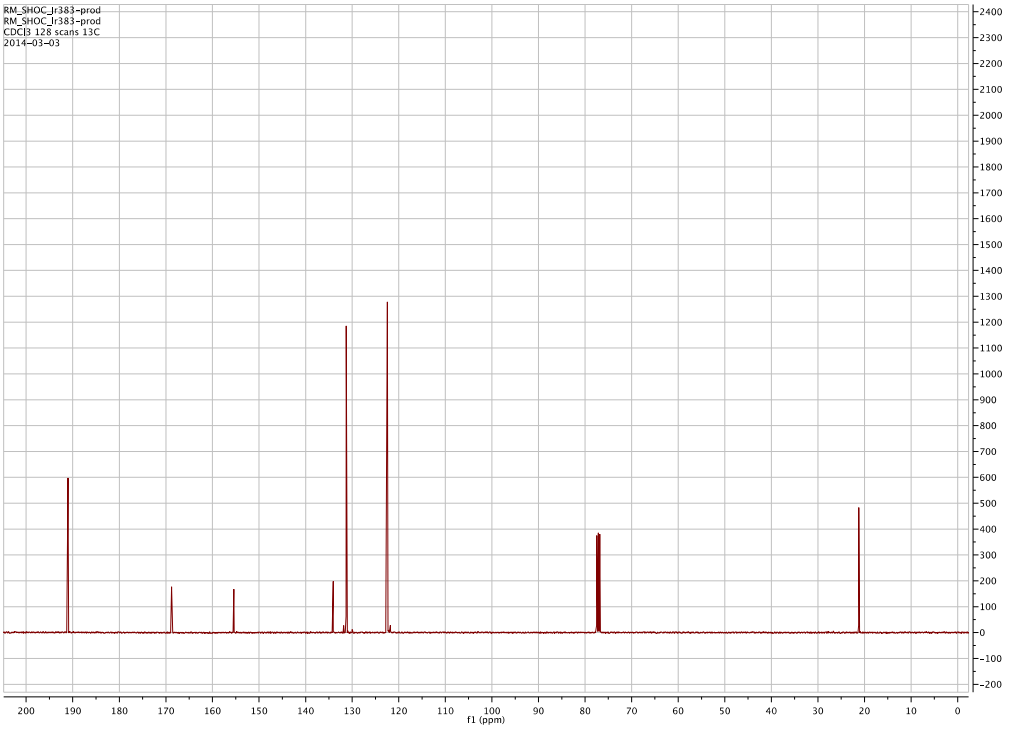
4-(4-Methylbenzenesulfonyloxy)benzaldehyde



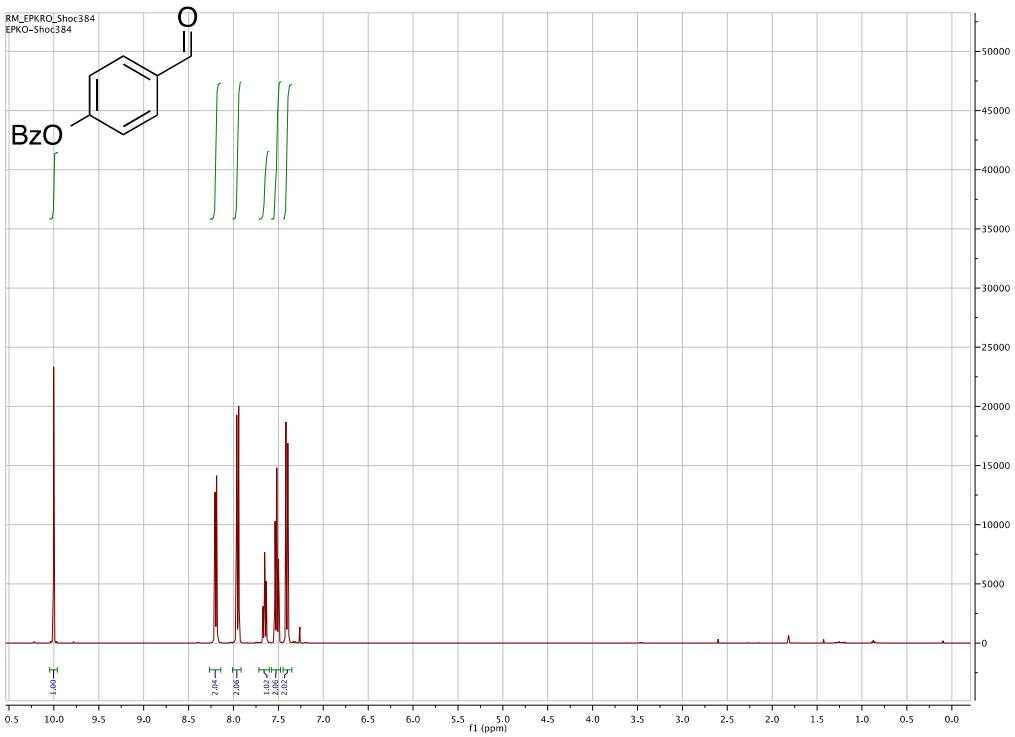


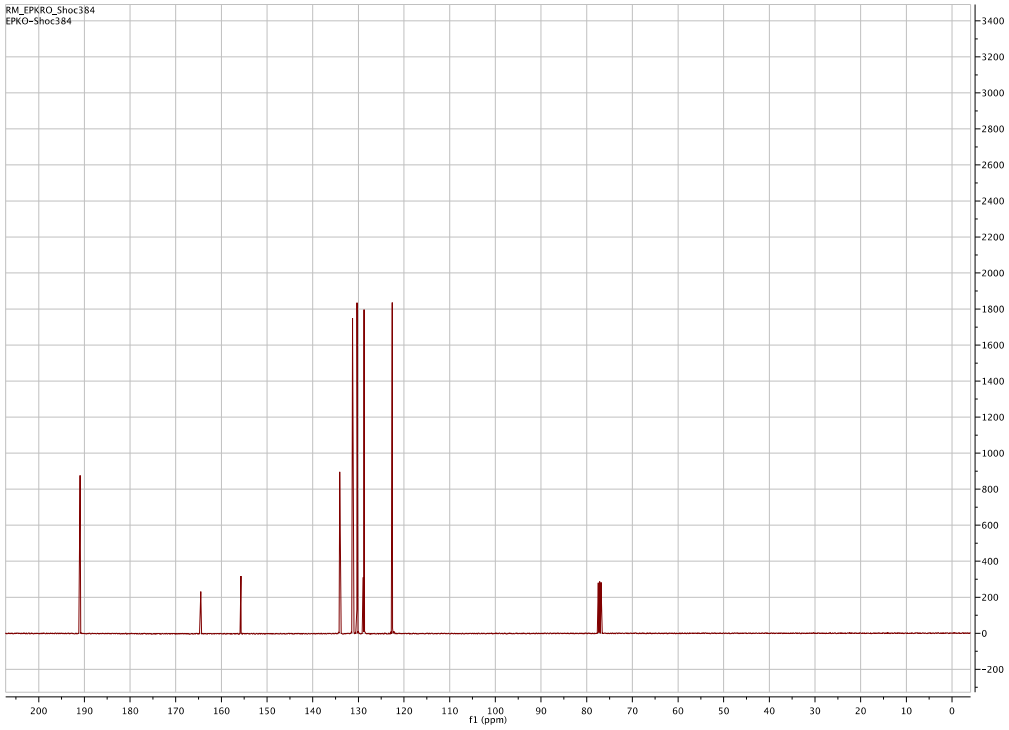
4-Formylphenyl acetate



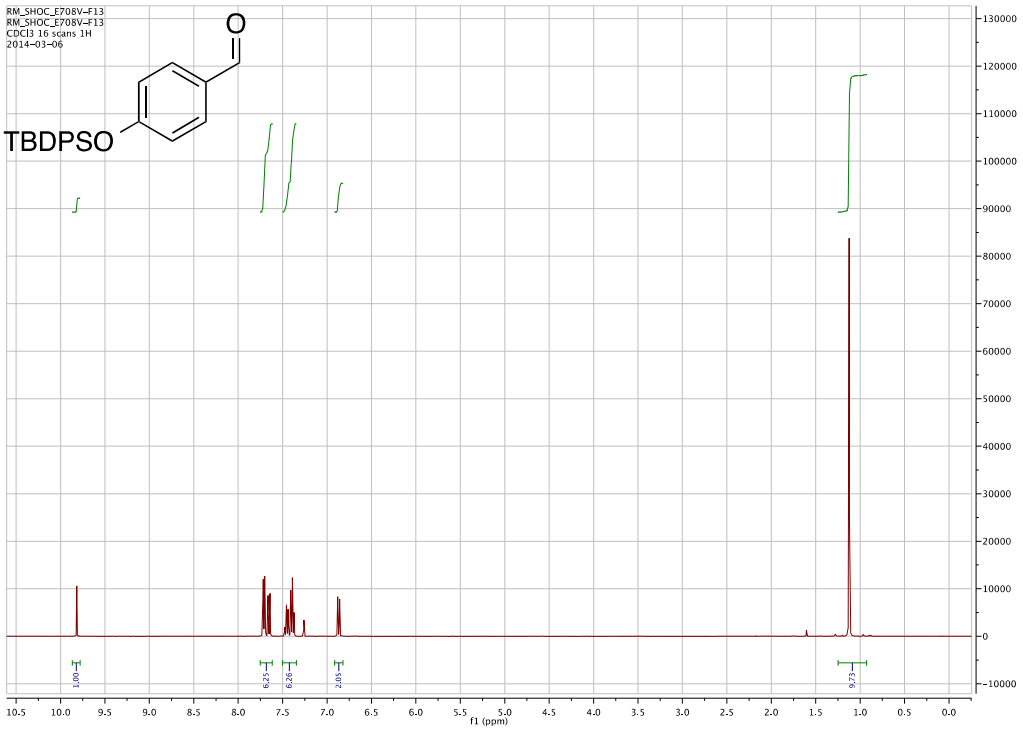


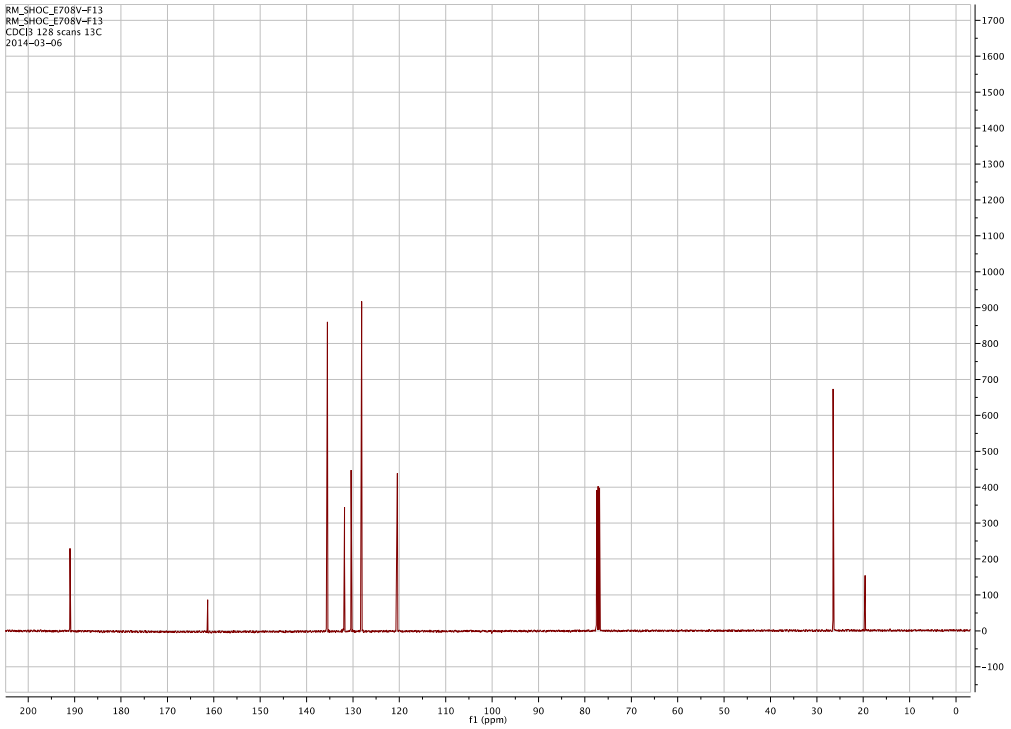
4-Formylphenyl benzoate





4-((*tert*-Butyldiphenylsilyl)oxy)benzaldehyde





4-(Benzyloxy)benzaldehyde