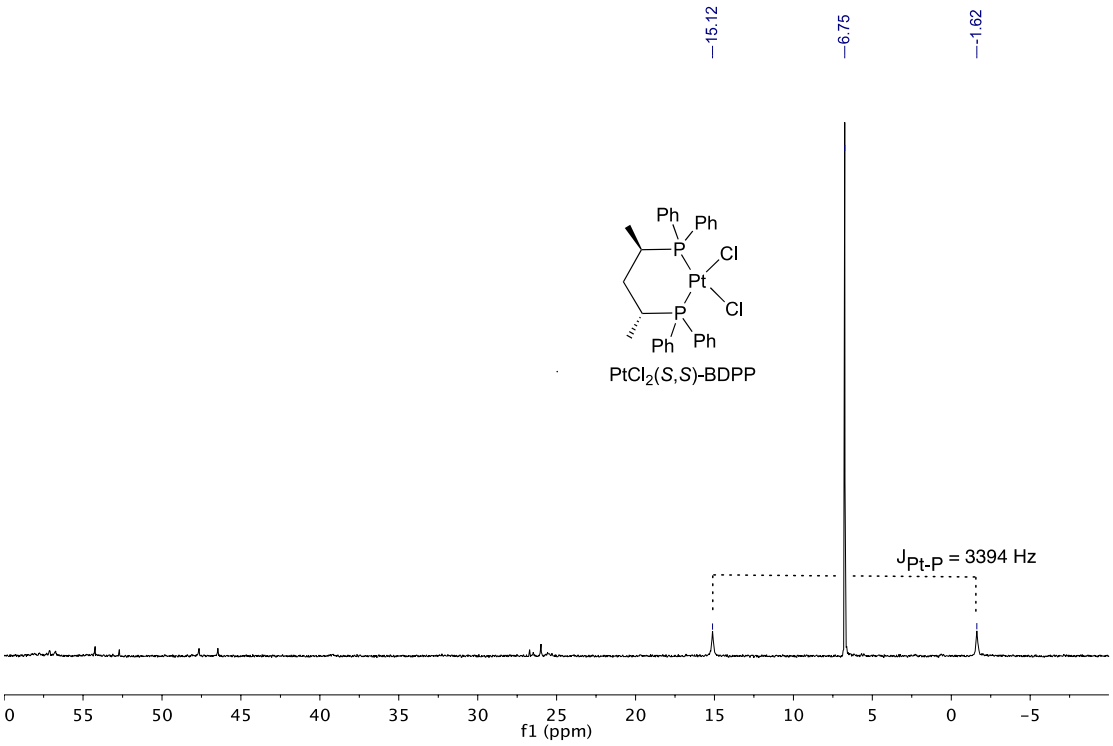
A step towards hydroformylation under sustainable conditions: platinum-catalysed enantioselective hydroformylation of styrene in gamma-valerolactone

Péter Pongrácz,[c] László Kollár[b,c] and László T. Mika[a,*]

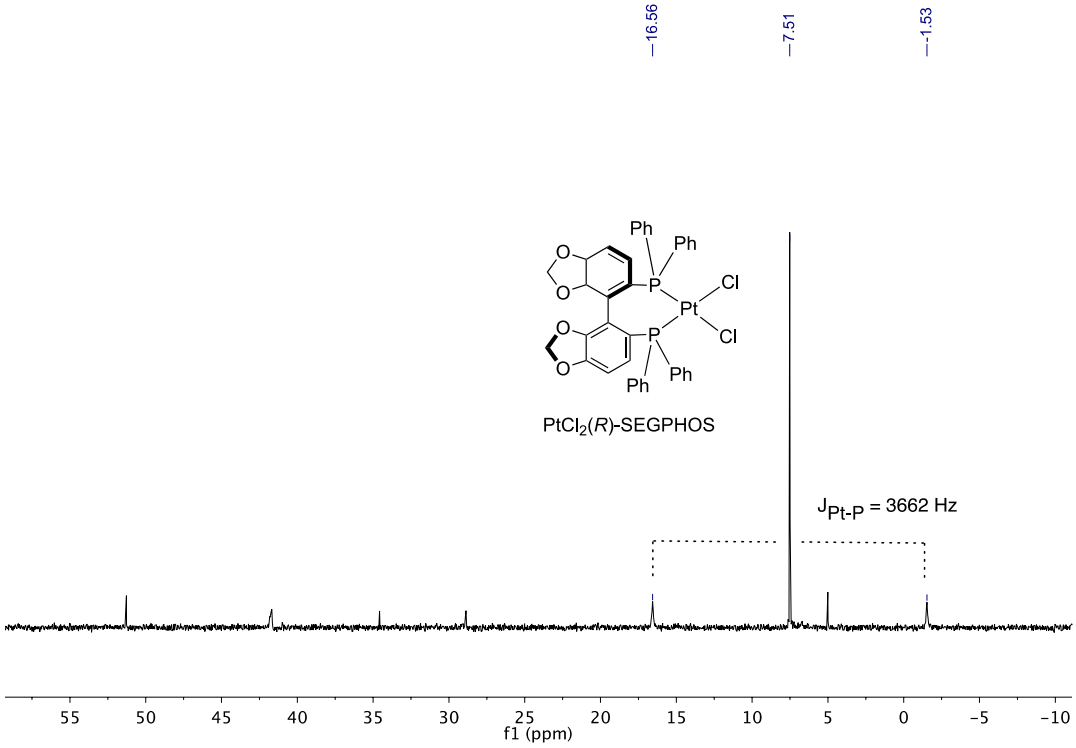
[a]*Department of Chemical and Environmental Process Engineering, Budapest University of Technology and Economics, Budapest, Hungary Fax: +36 1 463 3197; L. T. Mika: Tel.: +36 1 463 1263, e-mail: laszlo.t.mika@mail.bme.hu.*
[b]*Department of Inorganic Chemistry, University of Pécs and Szentágothai Research Center, Ifjúság u. 6., Pécs, H-7624, Hungary*
[c]*MTA-PTE Research Group for Selective Chemical Syntheses, Ifjúság u. 6., Pécs, H-7624, Hungary*

ELECTRONIC SUPPLEMENTARY INFORMATION

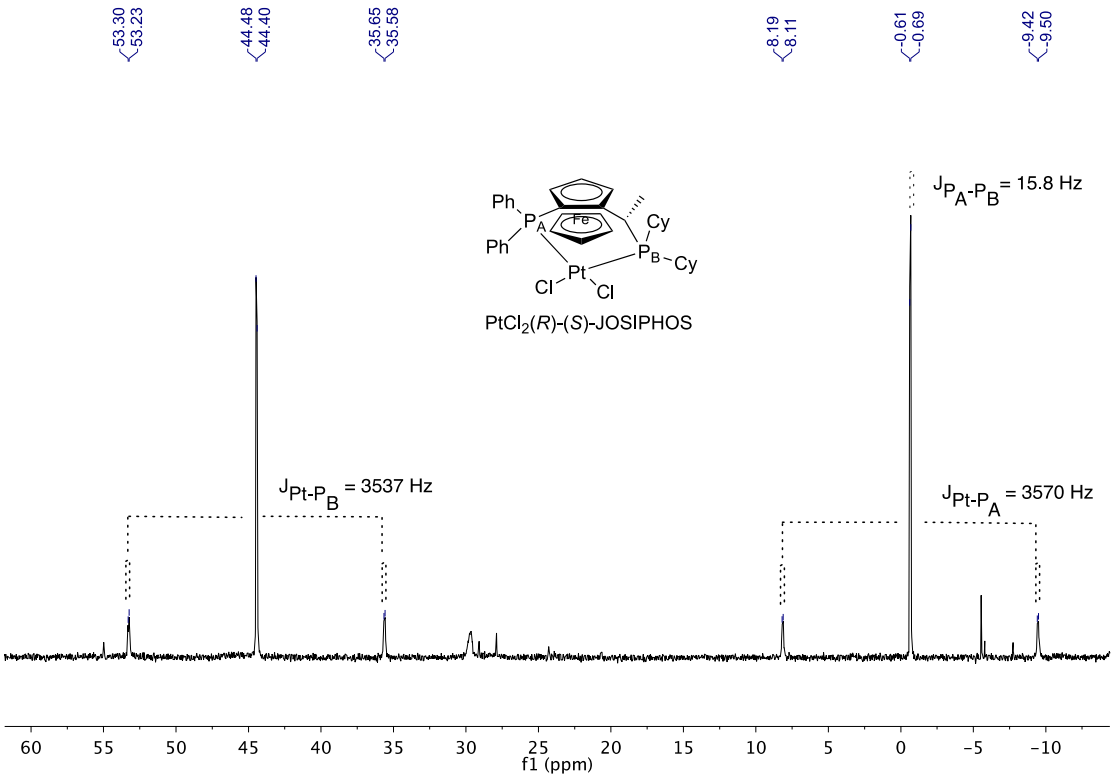
NMR Spectra of Pt-complexes in GVL



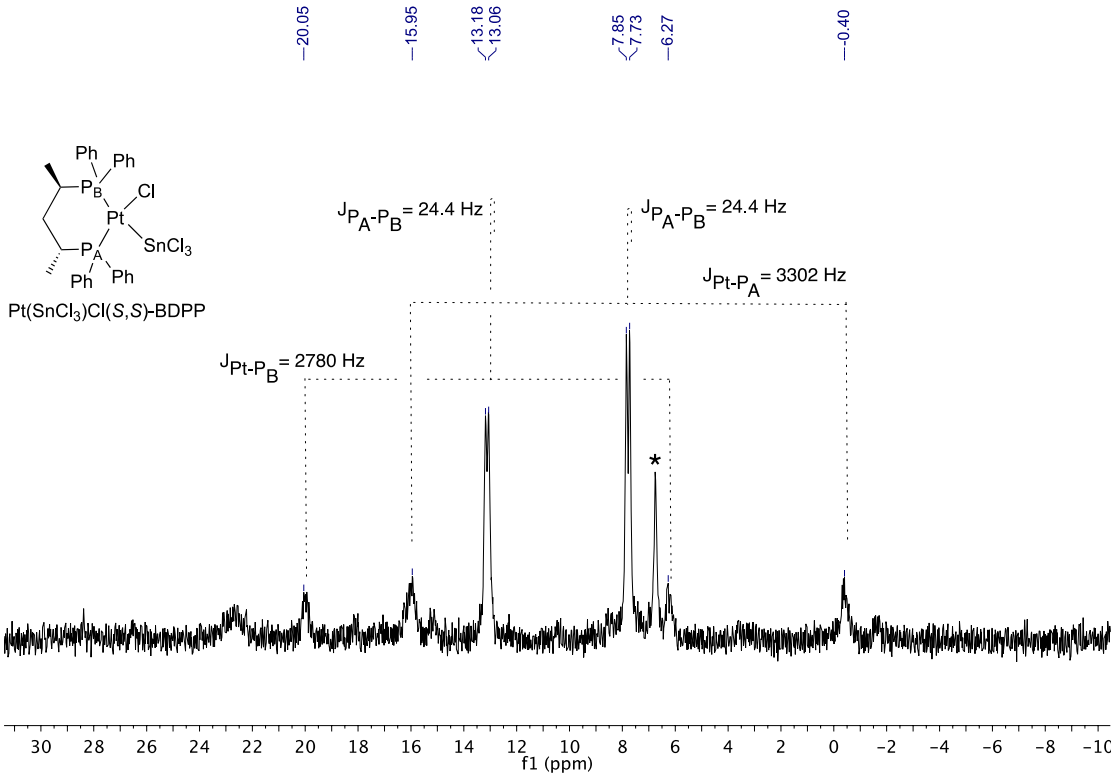
ESI-Fig S1 ^{31}P-NMR spectrum of $PtCl_2$(BDPP) complex in GVL



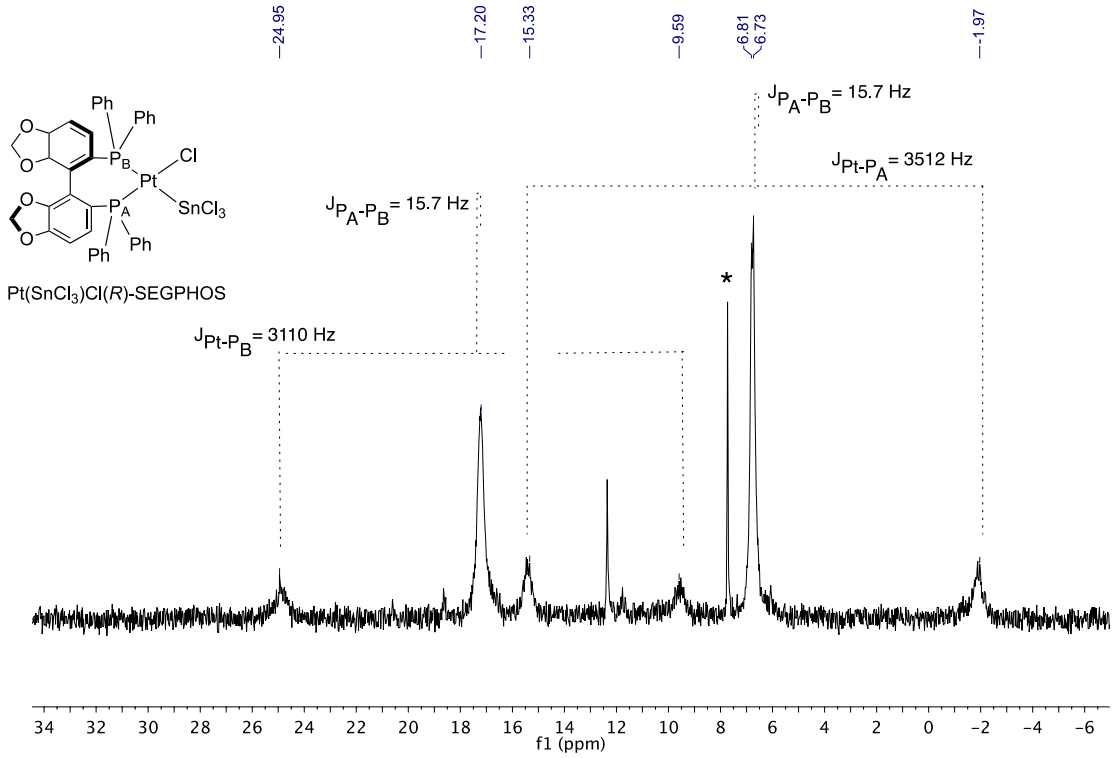
ESI-Fig S2 ^{31}P-NMR spectrum of $PtCl_2$(SEGPHOS) complex in GVL



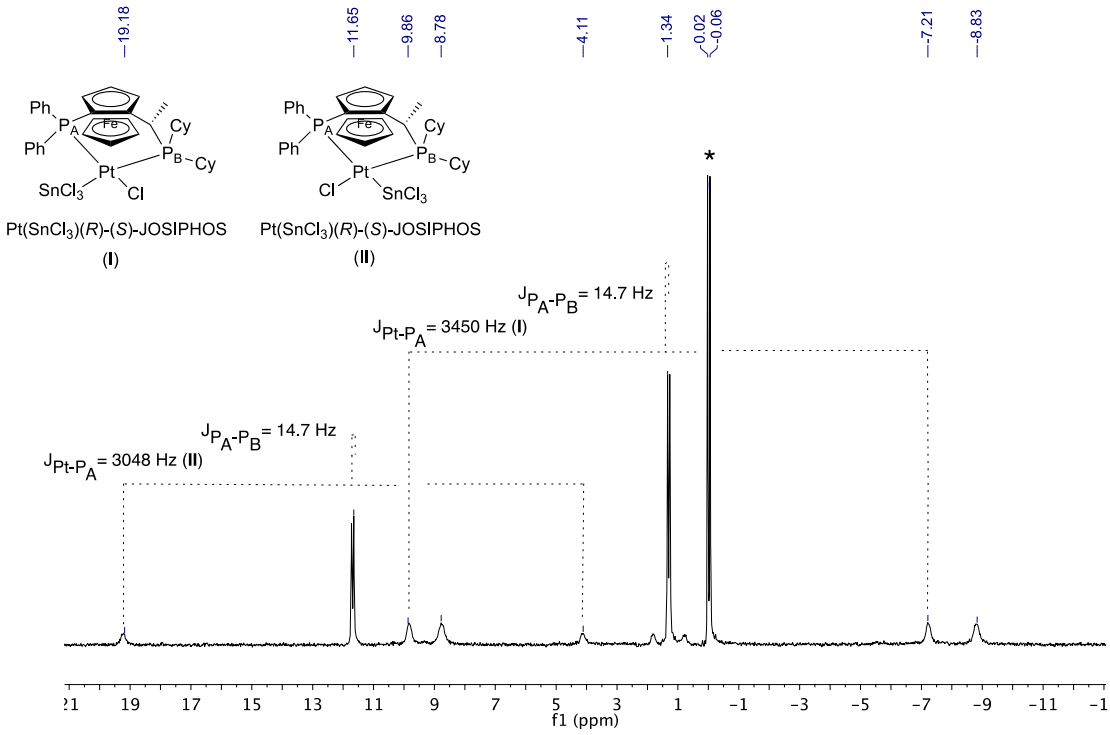
ESI-Fig S3 ^{31}P-NMR spectrum of $PtCl_2$(JOSIPHOS) complex in GVL.
Cy: cyclohexyl



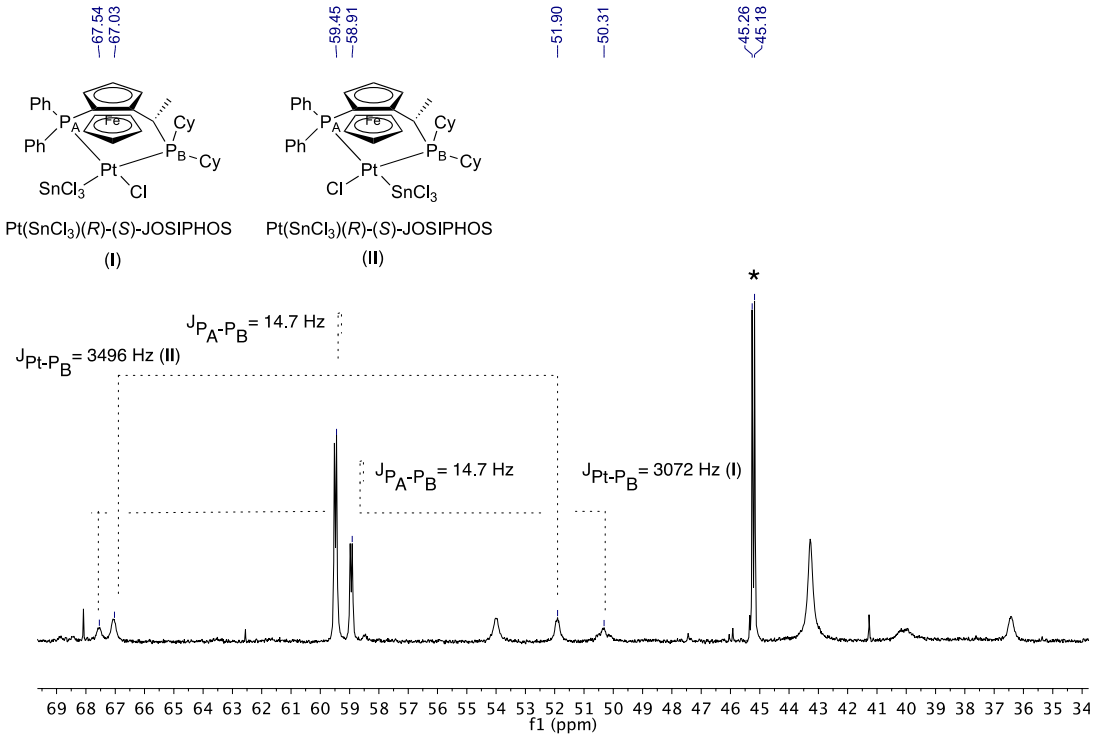
ESI-Fig S4 ^{31}P-NMR spectrum of PtCl($SnCl_3$)(BDPP) complex in GVL
*: unreacted dichloro complex (6.75 ppm)



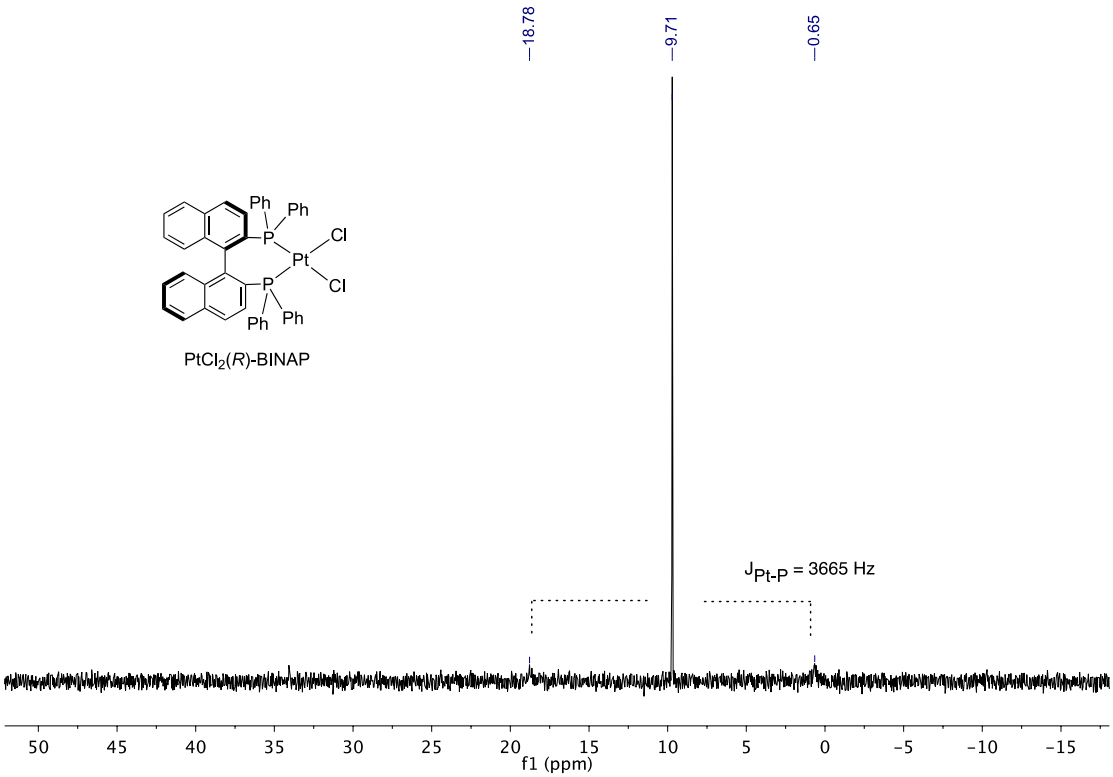
ESI-Fig S5 ^{31}P-NMR spectrum of PtCl($SnCl_3$)(SEGPHOS) complex in GVL
*: unreacted dichloro complex (7.51 ppm)



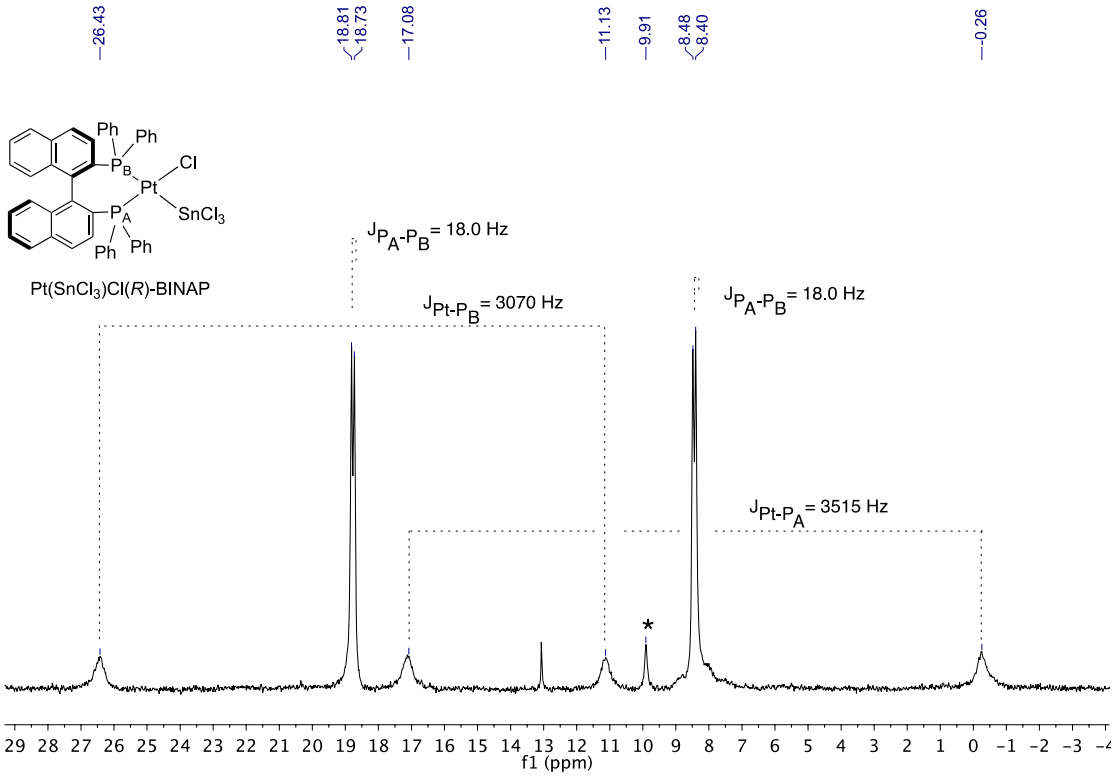
ESI-Fig S6 ^{31}P-NMR spectrum of PtCl($SnCl_3$)(JOSIPHOS) complex in GVL (Region 21 – -12 ppm). *: unreacted dichloro complex (0.04 ppm)



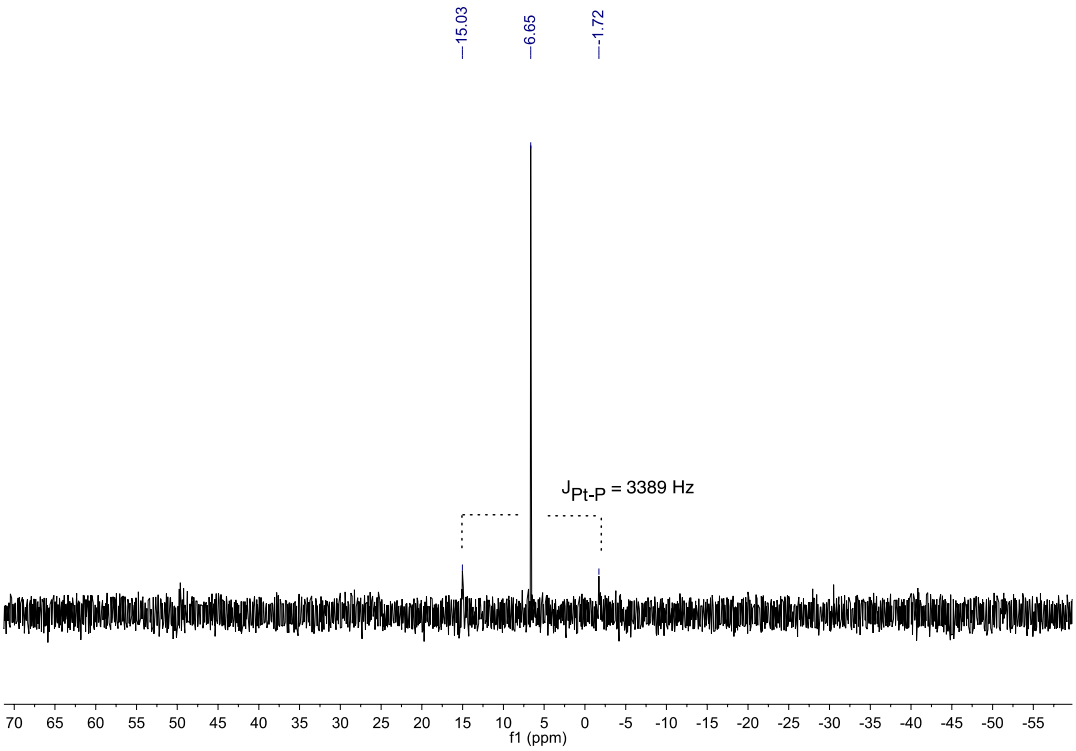
ESI-Fig S7 ^{31}P-NMR spectrum of PtCl($SnCl_3$)(JOSIPHOS) complex in GVL (Region 70 – 34 ppm), *: unreacted dichloro complex (45.2 ppm)



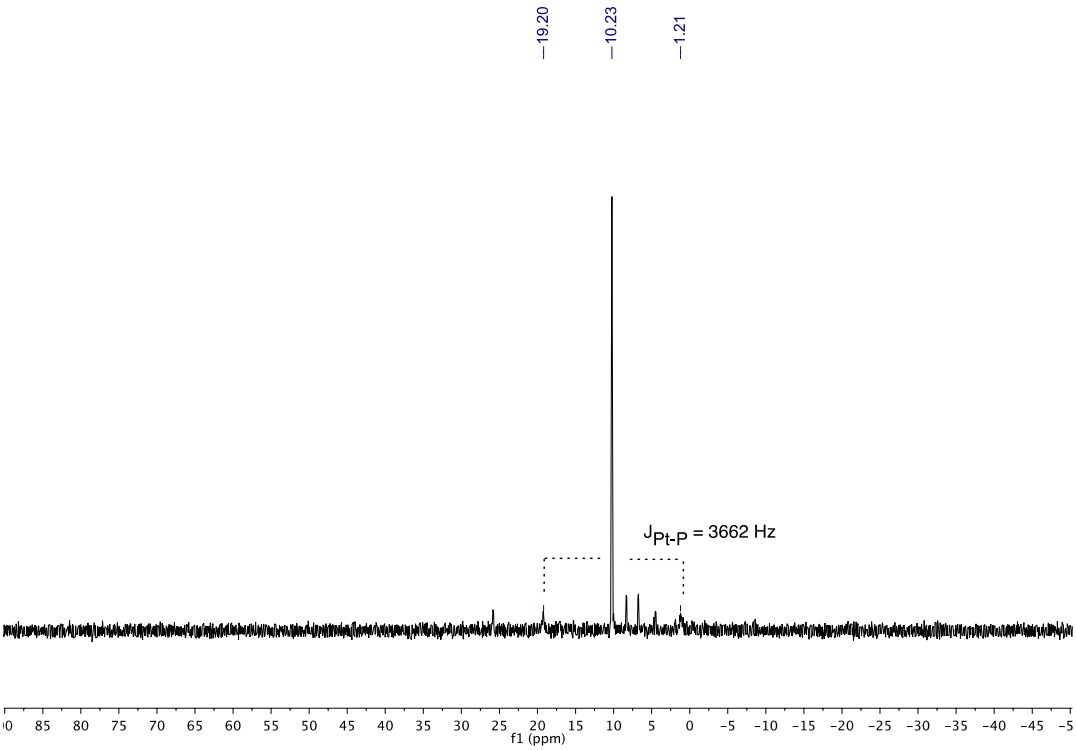
ESI-Fig S8 ^{31}P-NMR spectrum of $PtCl_2$(BINAP) complex in GVL



ESI-Fig S9 ^{31}P-NMR spectrum of $PtCl(SnCl_3)$(BINAP) complex in GVL (*: unreacted dichloro complex (9.91 ppm)



ESI-Fig S10 ^{31}P-NMR spectrum of the reused $PtCl(SnCl_3)$(BDPP) catalyst



ESI-Fig S11 ^{31}P-NMR spectrum of the reused $PtCl(SnCl_3)$(BINAP) catalyst