

Supporting Information

Synthesis and Properties of Novel Isopropyl-Functionalized Polyglycolide-PEG

Copolymers

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ATR-FTIR Spectra

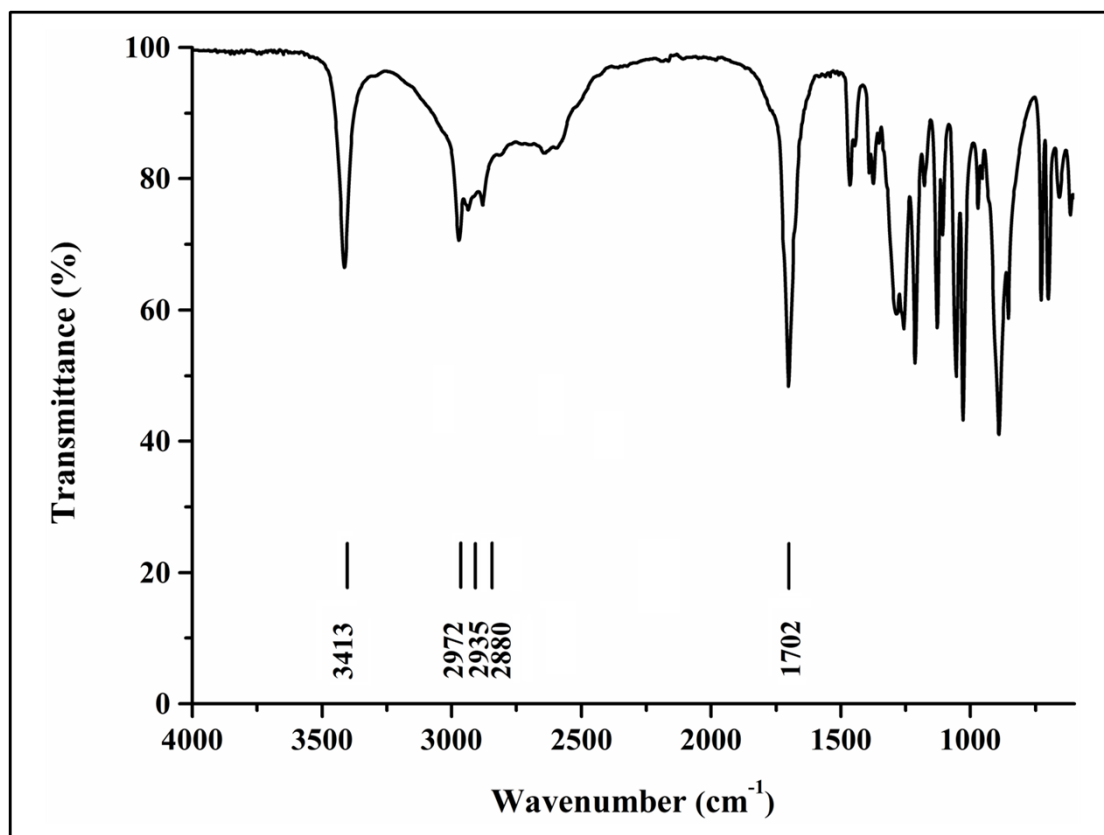


Figure 1. ATR-FTIR spectrum of *l*-2-hydroxy-3-methylbutanoic acid (2)

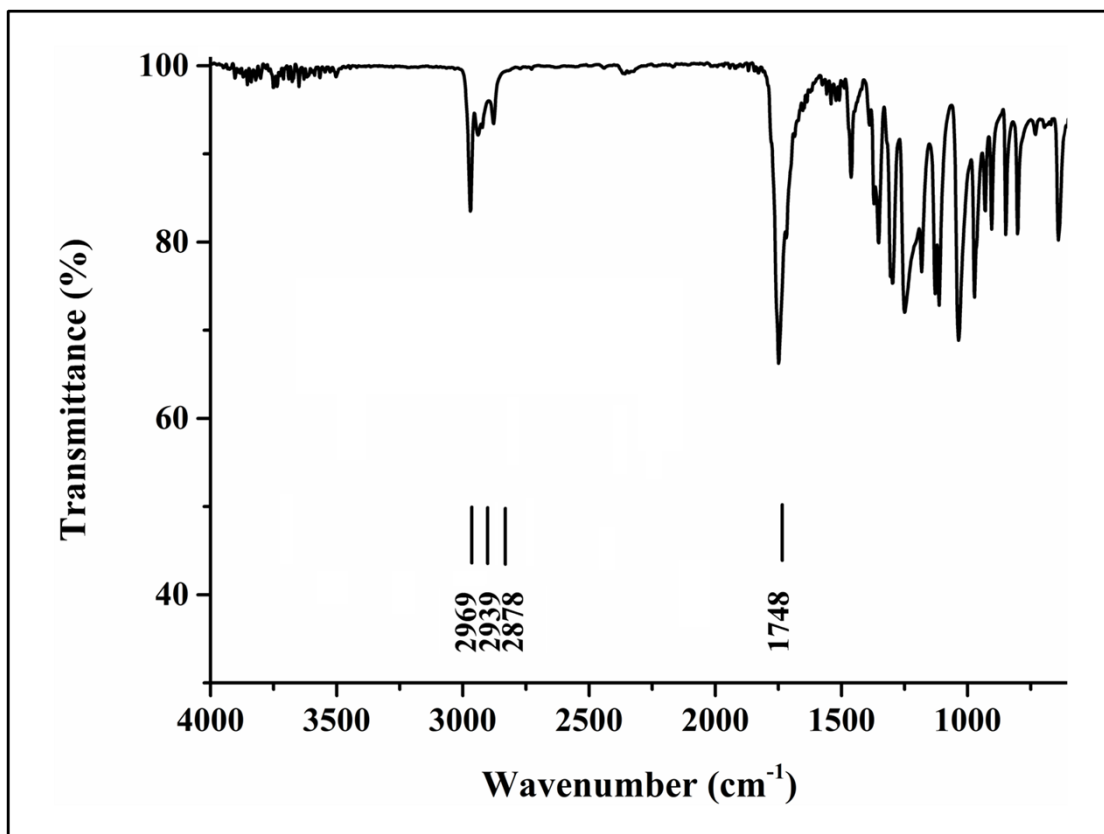


Figure 2. ATR-FTIR spectrum of *l*-3,6-diisopropyl-1,4-dioxane-2,5-dione (3)

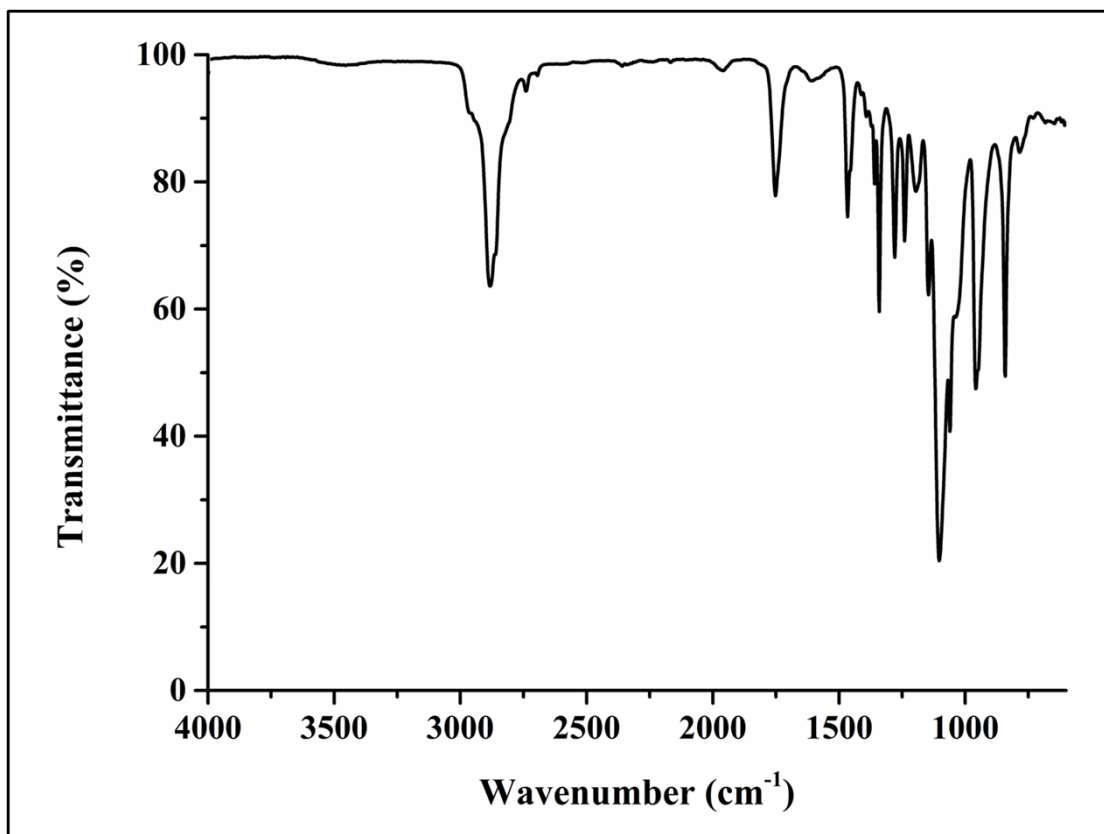


Figure 3. ATR-FTIR spectrum of MePEG-PDIPG (6)

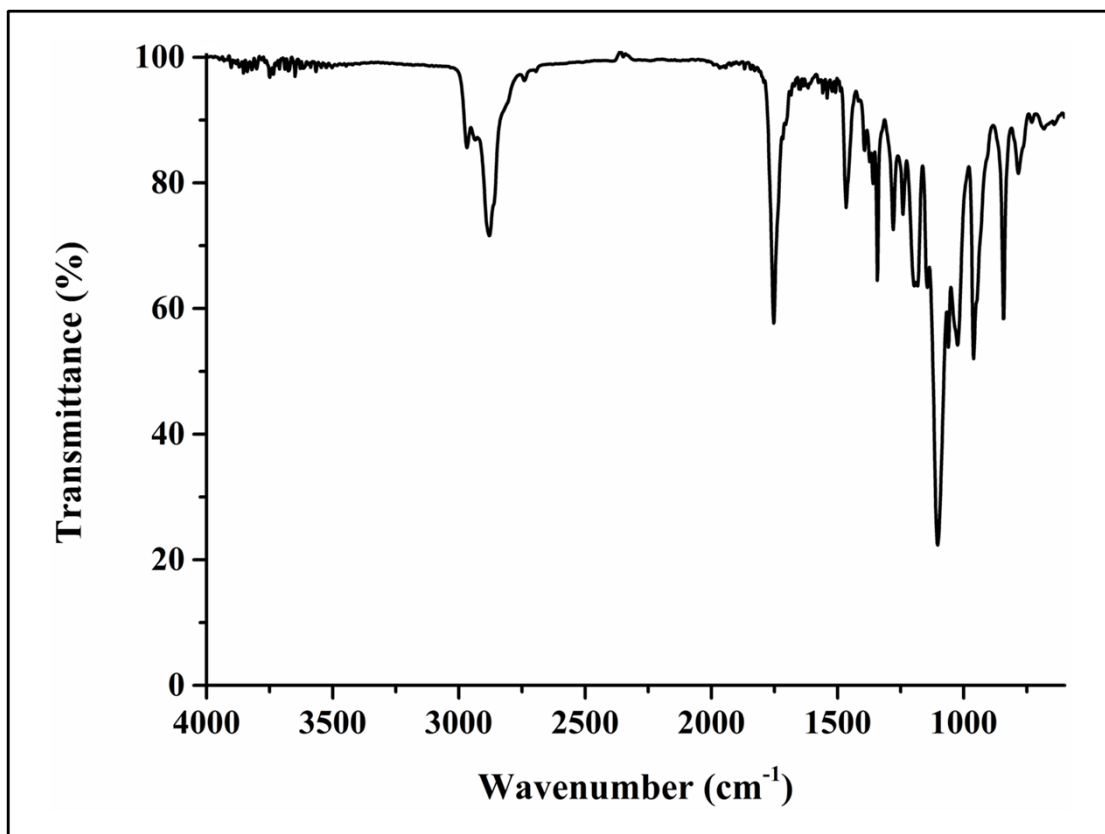


Figure 4. ATR-FTIR spectrum of MePEG-PDIPG (7)

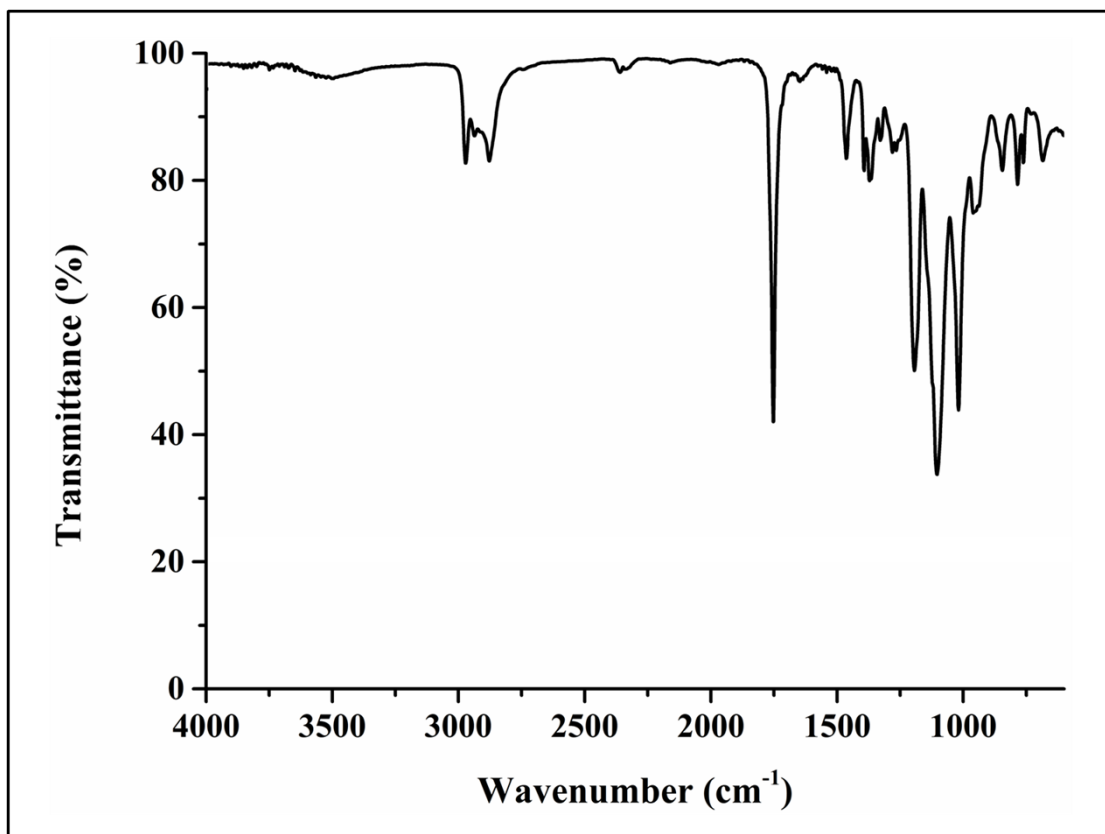


Figure 5. ATR-FTIR spectrum of MePEG-PDIPG (8)

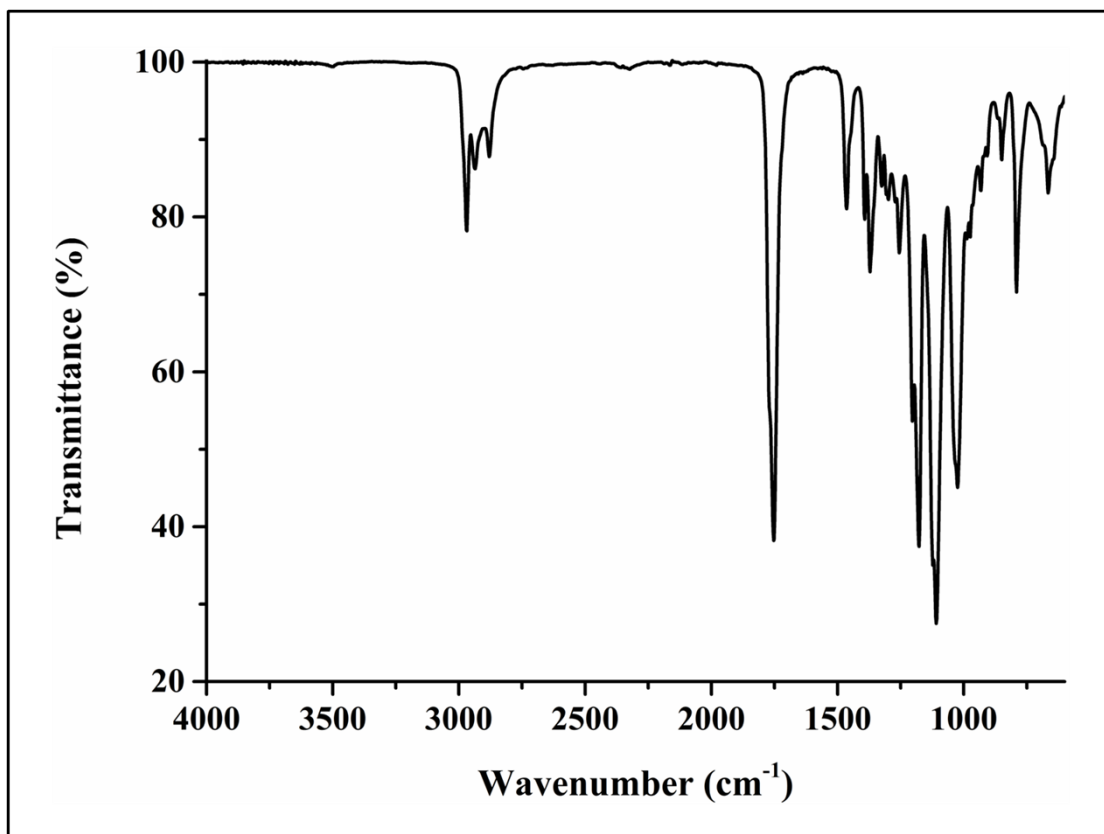


Figure 6. ATR-FTIR spectrum of MePEG-PDIPG (10)

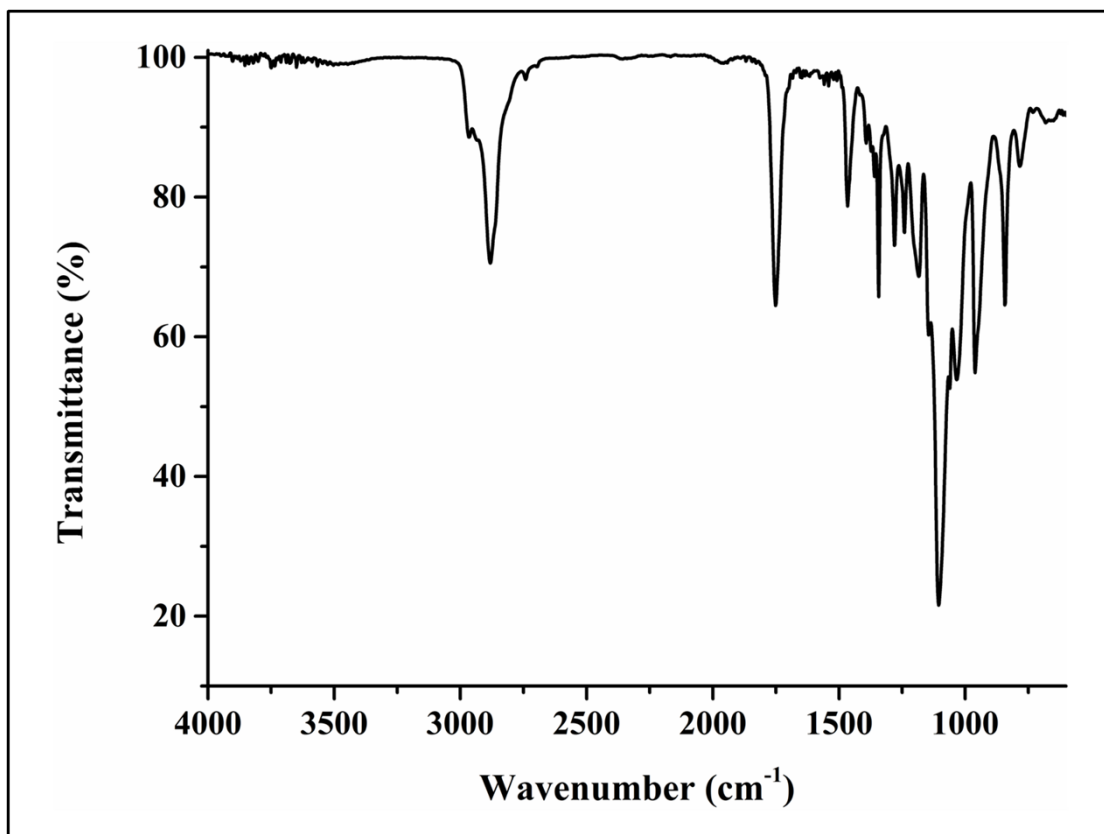


Figure 7. ATR-FTIR spectrum of PDIPG-PEG-PDIPG (11)

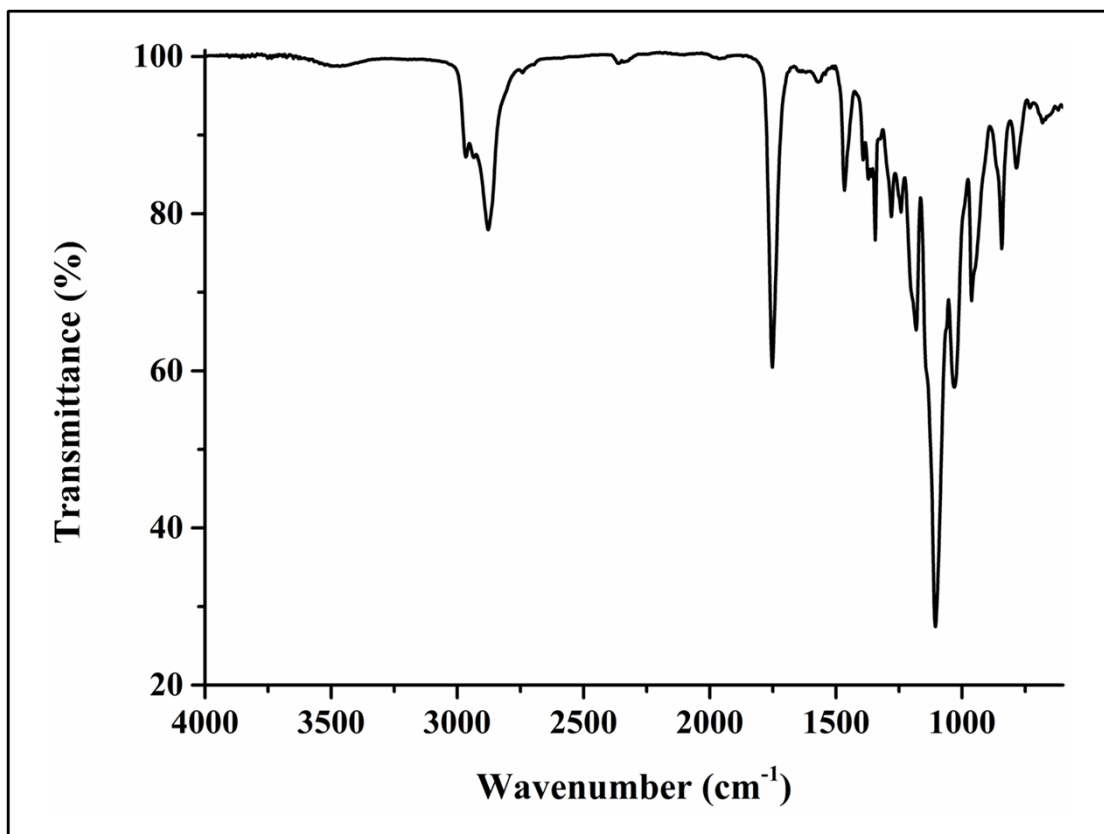


Figure 8. ATR-FTIR spectrum of PDIPG-PEG-PDIPG (12)

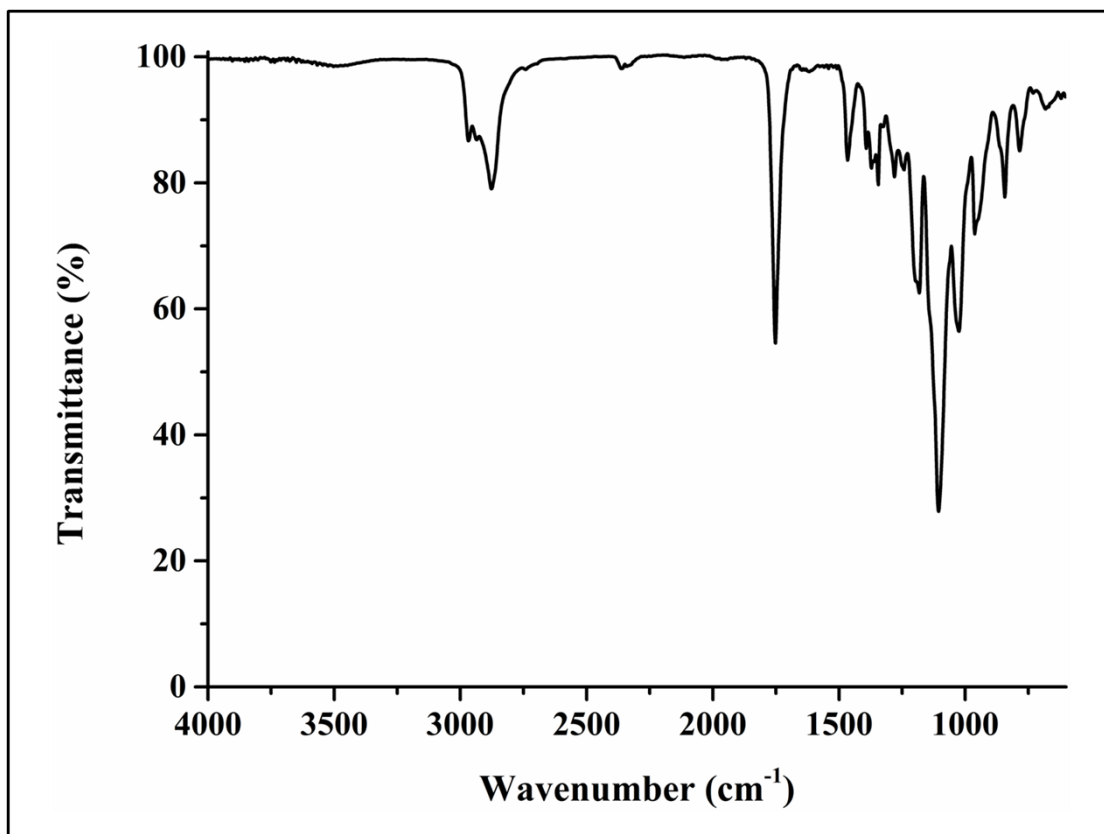


Figure 9. ATR-FTIR spectrum of PDIPG-PEG-PDIPG (13)

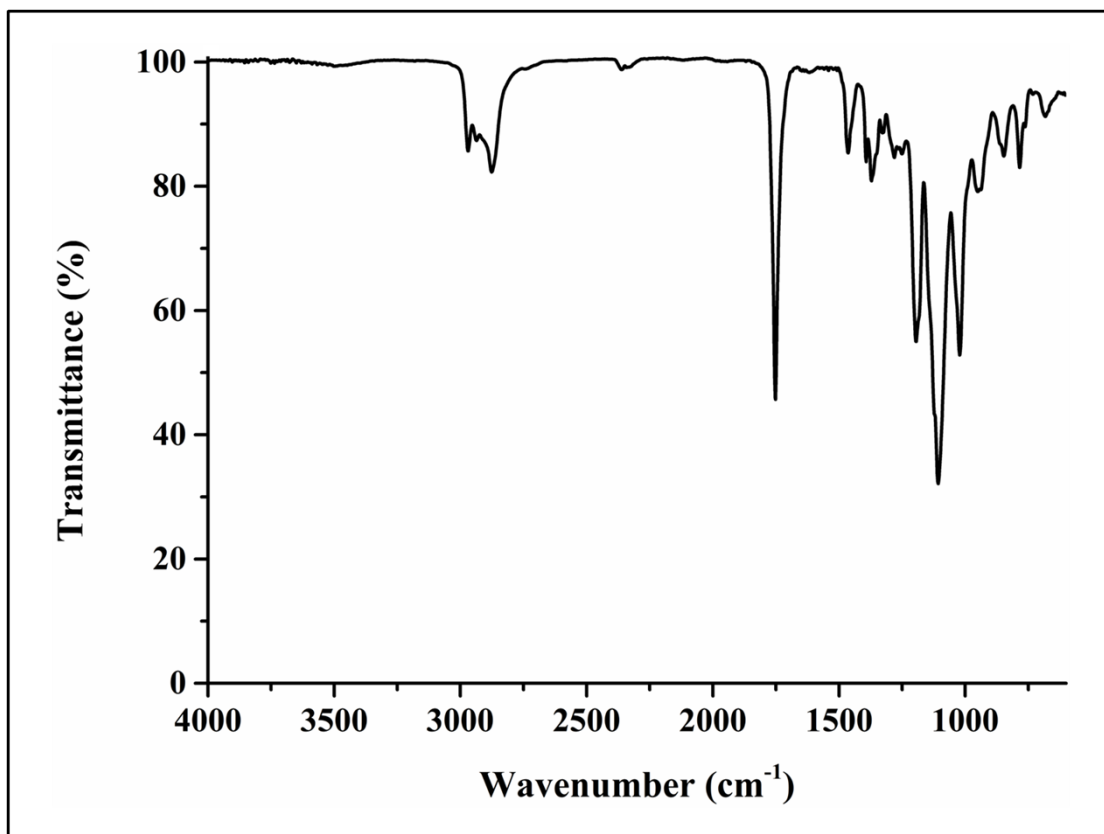


Figure 10. ATR-FTIR spectrum of PDIPG-PEG-PDIPG (14)

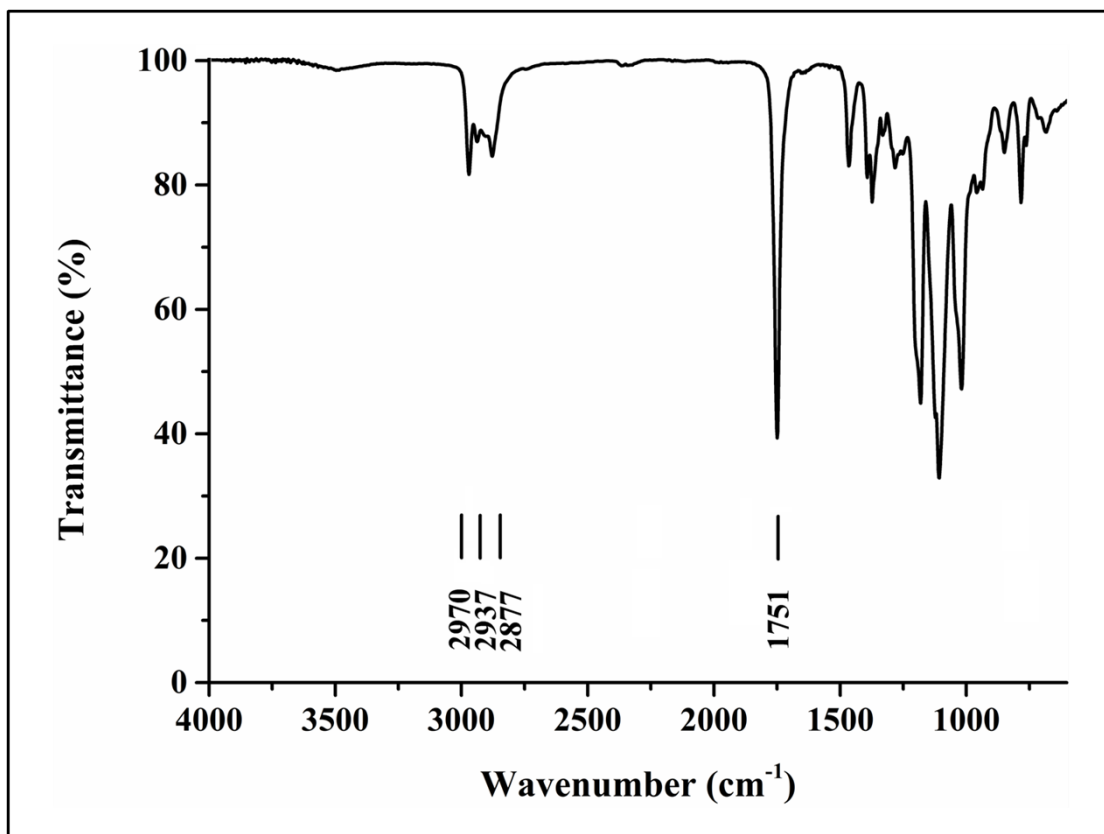


Figure 11. ATR-FTIR spectrum of PDIPG-PEG-PDIPG (15)

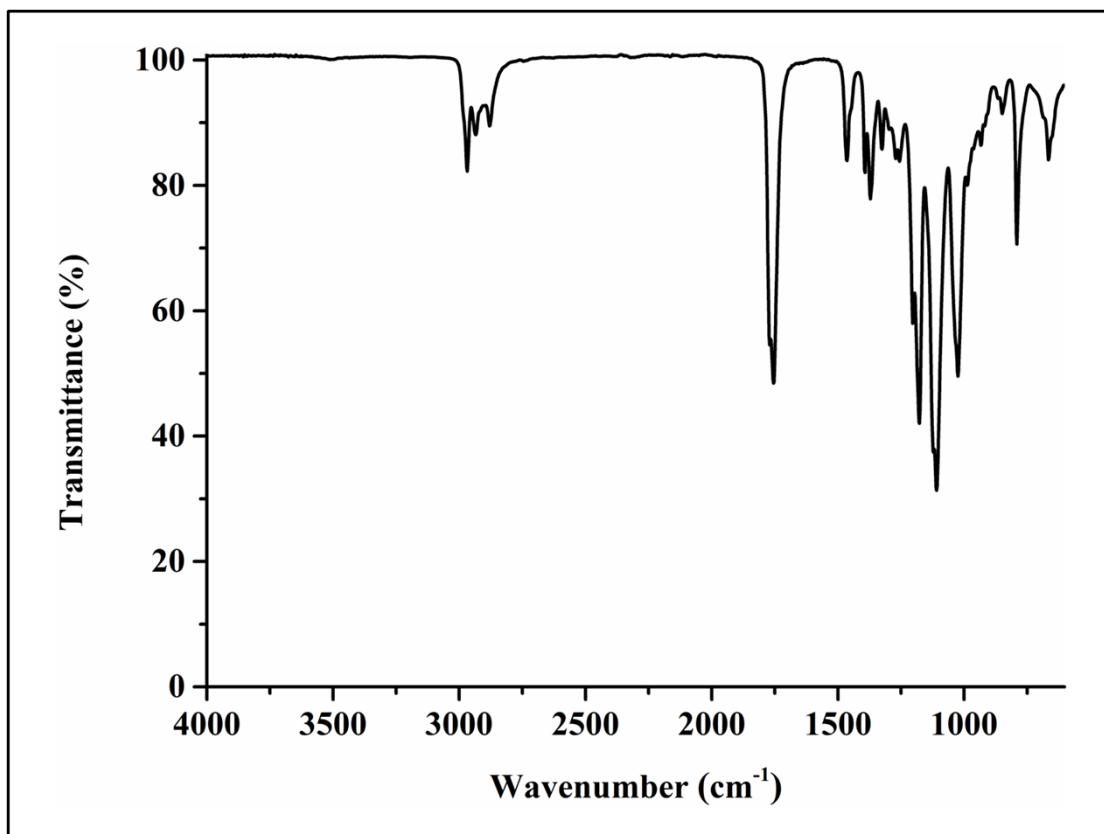


Figure 12. ATR-FTIR spectrum of PDIPG-PEG-PDIPG (16)

$^1\text{H-NMR}$ Spectra

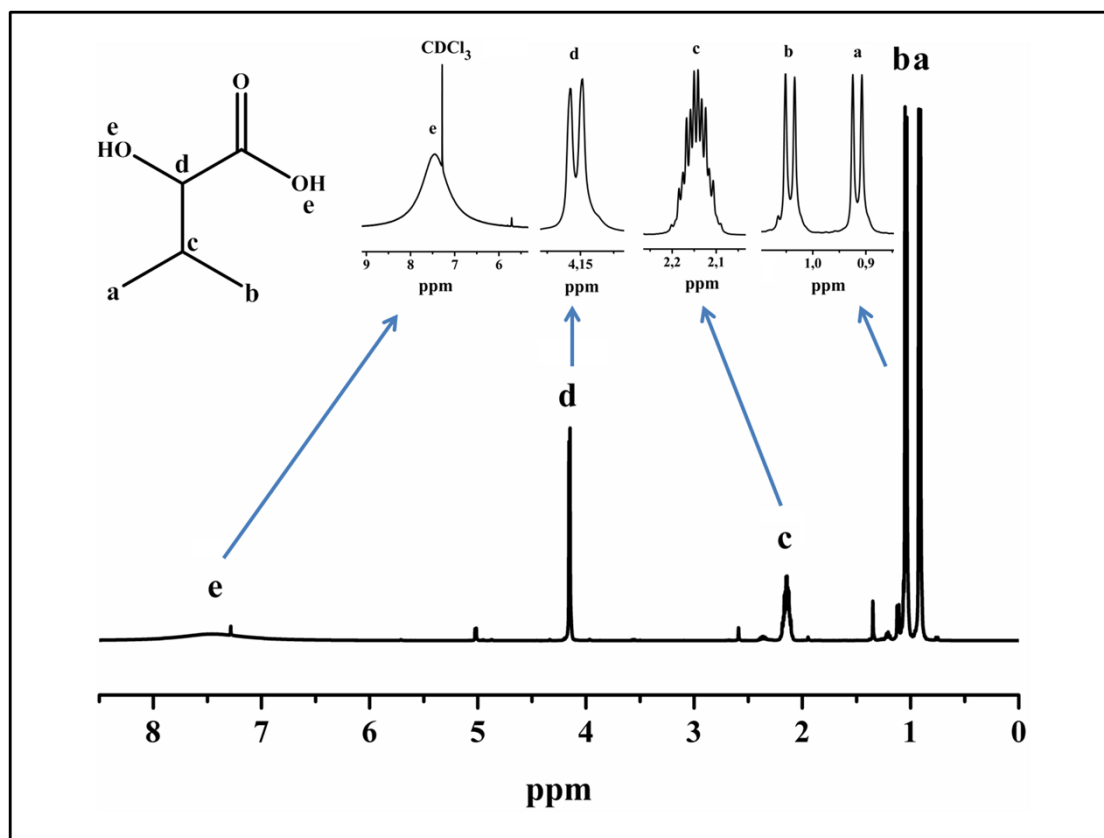


Figure 13. $^1\text{H-NMR}$ spectrum of *l*-2-hydroxy-3-methylbutanoic acid (2)

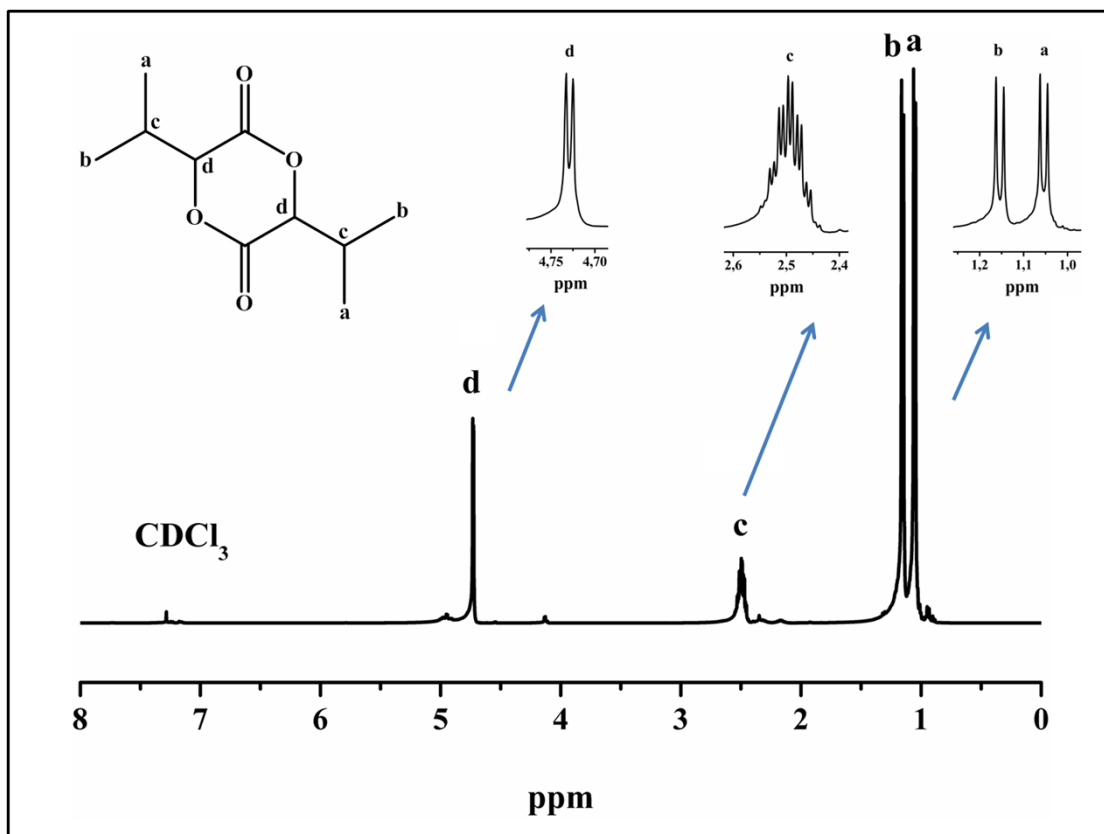


Figure 14. $^1\text{H-NMR}$ spectrum of *l*-3,6-diisopropyl-1,4-dioxane-2,5-dione (3)

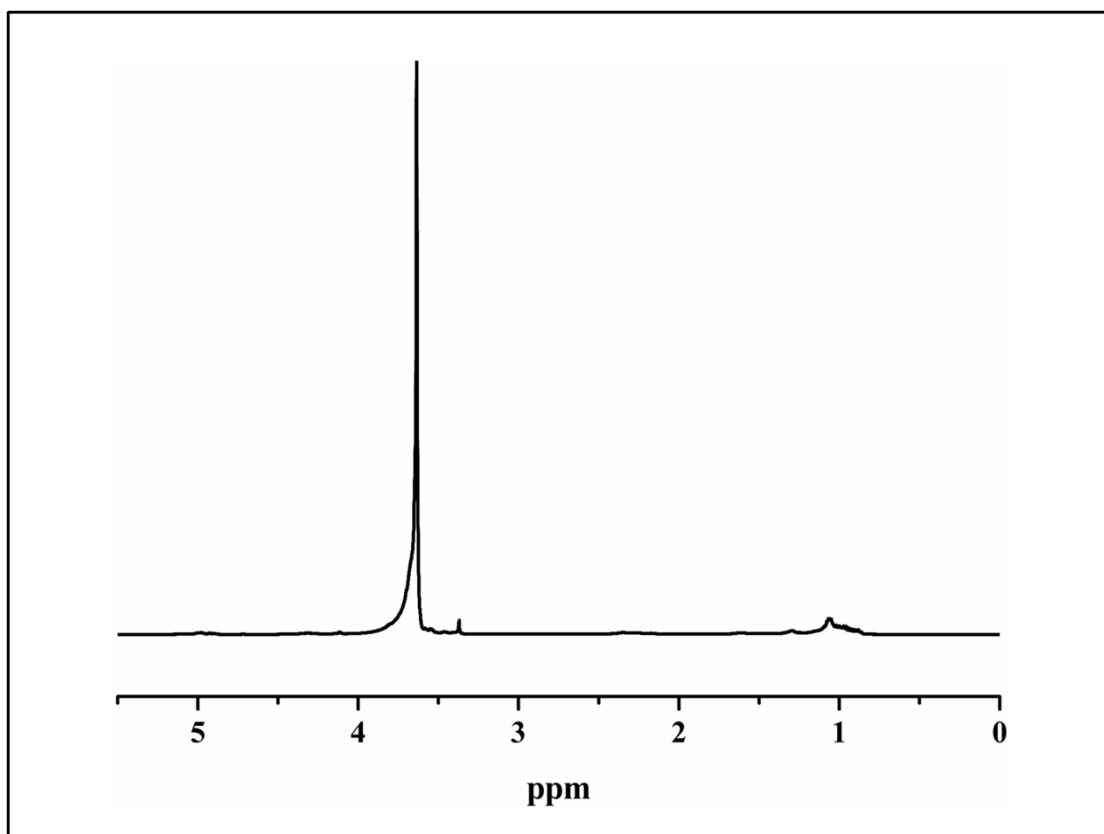


Figure 15. $^1\text{H-NMR}$ spectrum of MePEG-PDIPG (6)

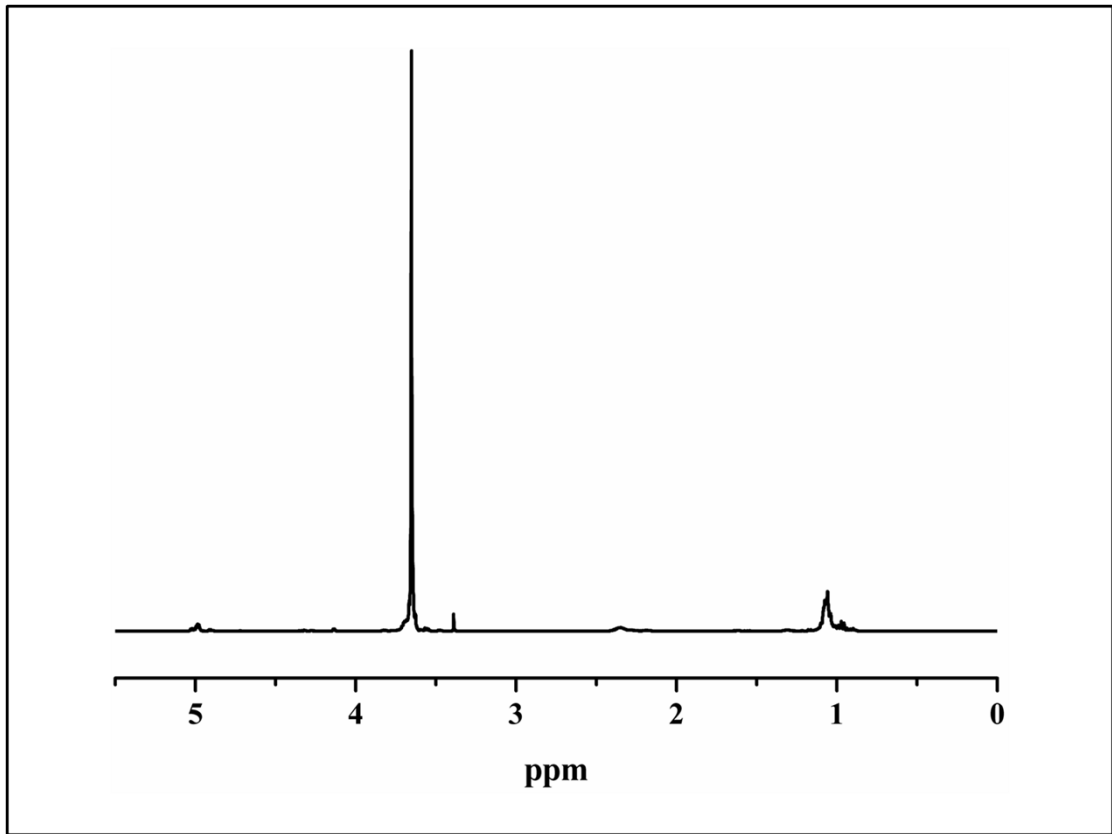


Figure 16. ¹H-NMR spectrum of MePEG-PDIPG (7)

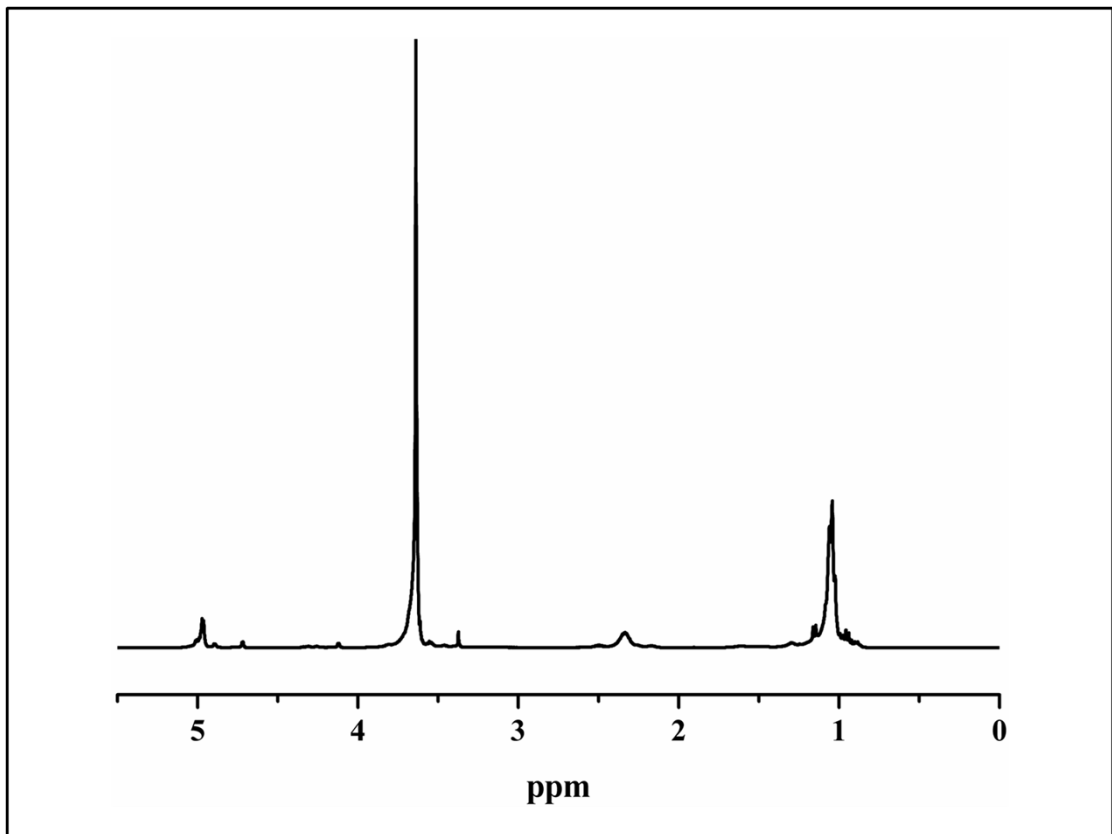


Figure 17. ¹H-NMR spectrum of MePEG-PDIPG (8)

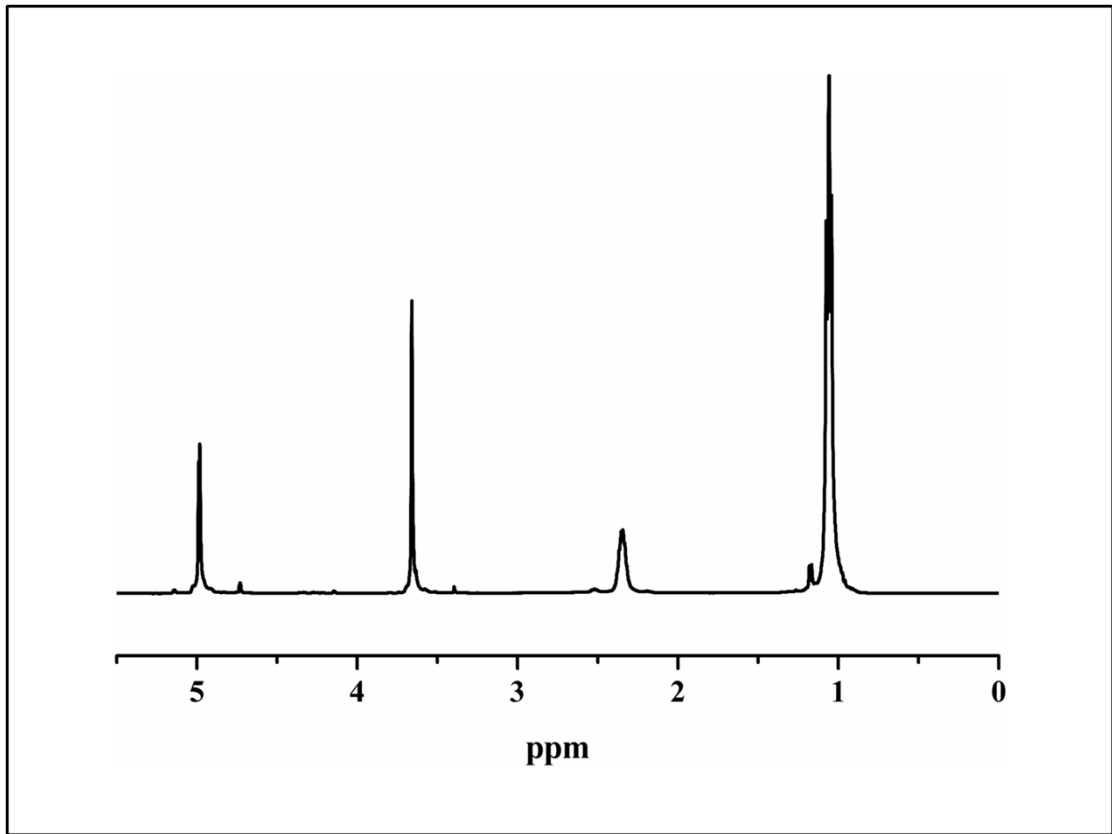


Figure 18. $^1\text{H-NMR}$ spectrum of MePEG-PDIPG (10)

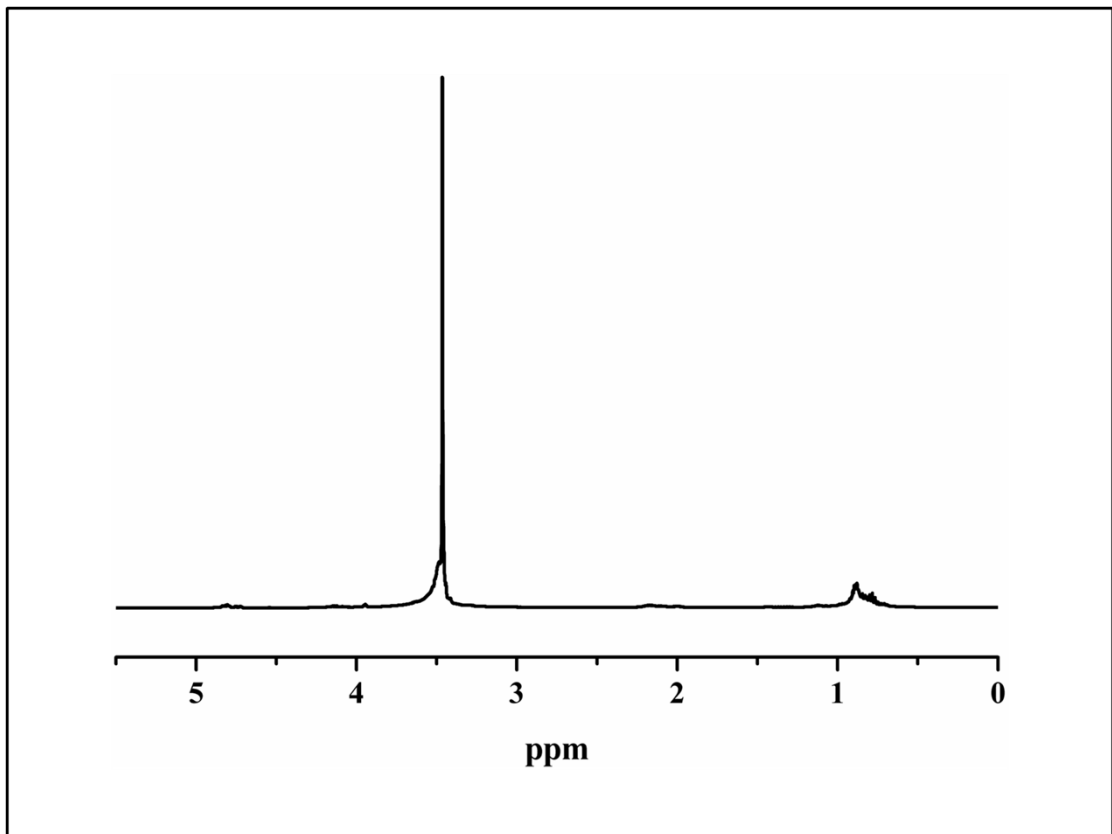


Figure 19. $^1\text{H-NMR}$ spectrum of PDIPG-PEG-PDIPG (11)

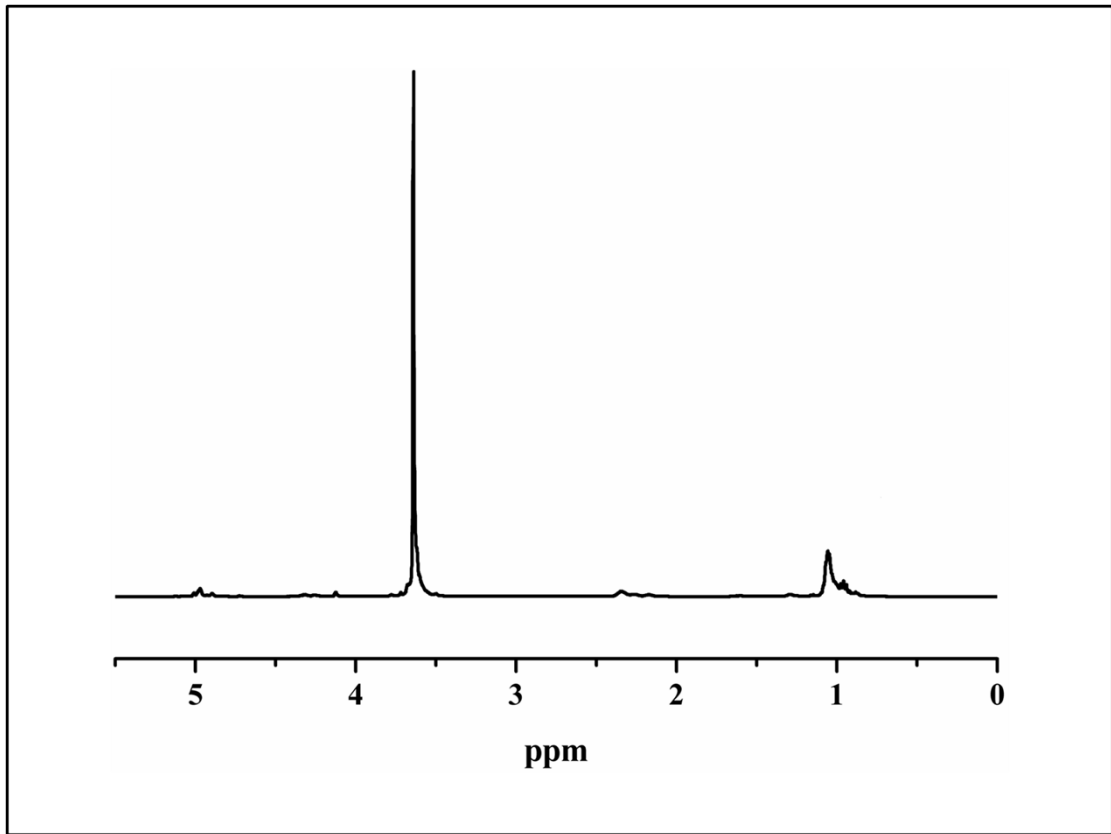


Figure 20. ^1H -NMR spectrum of PDIPG-PEG-PDIPG (12)

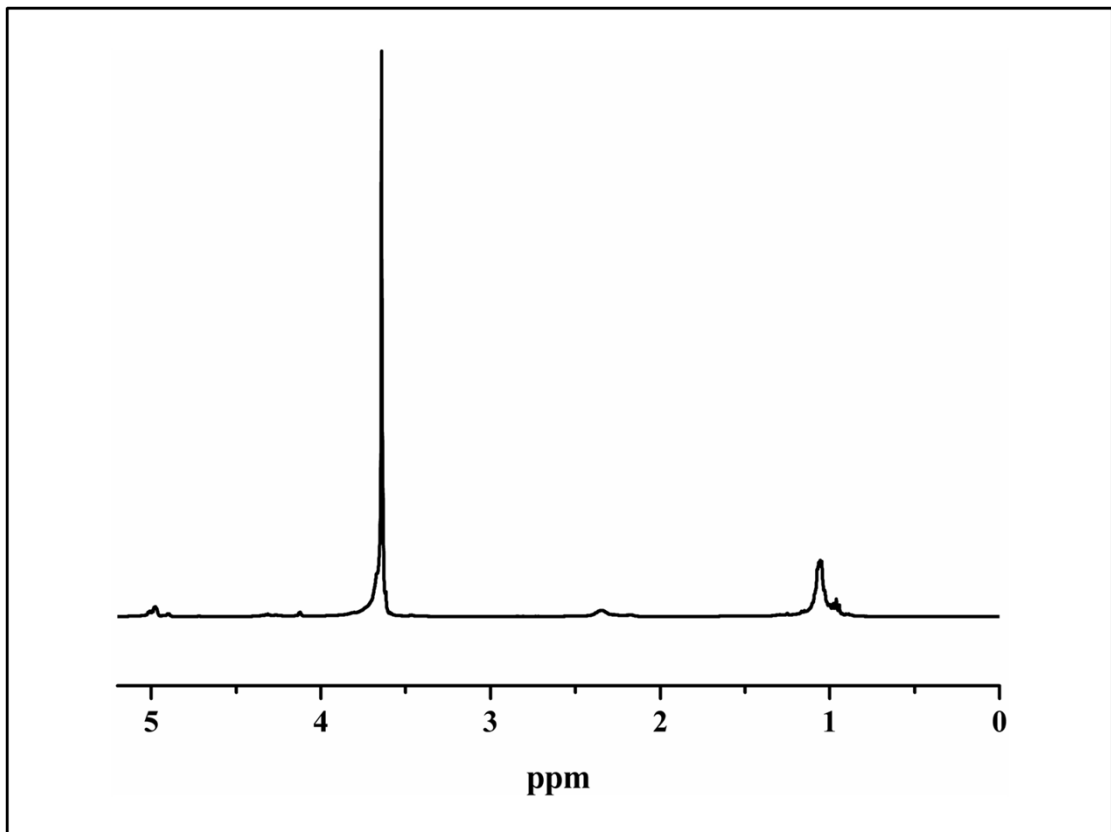


Figure 21. ^1H -NMR spectrum of PDIPG-PEG-PDIPG (13)

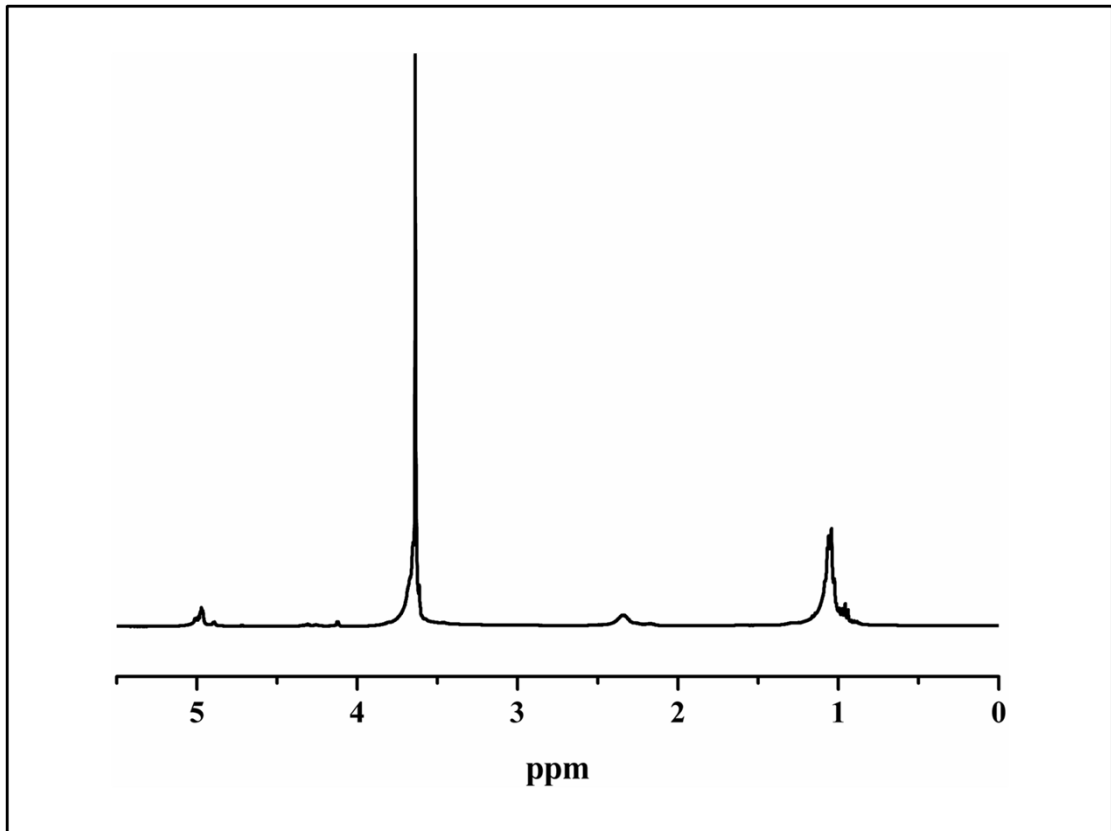


Figure 22. ¹H-NMR spectrum of PDIPG-PEG-PDIPG (14)

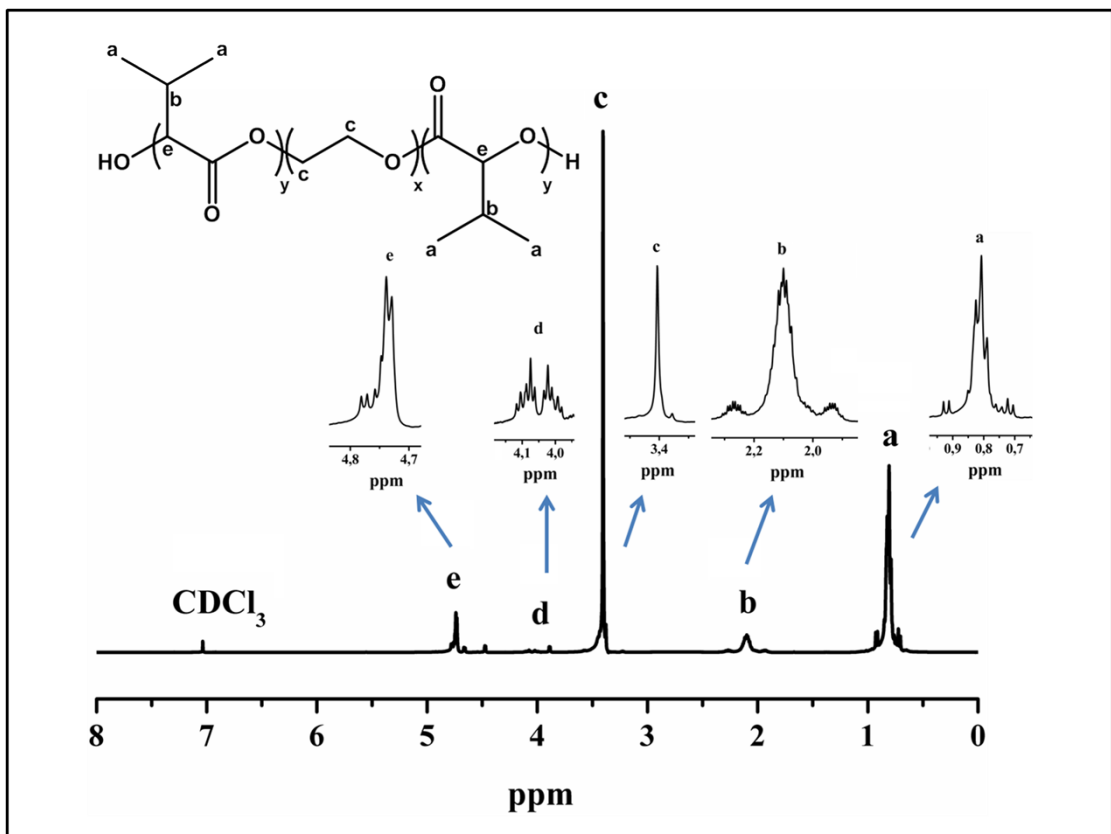


Figure 23. ¹H-NMR spectrum of PDIPG-PEG-PDIPG (15)

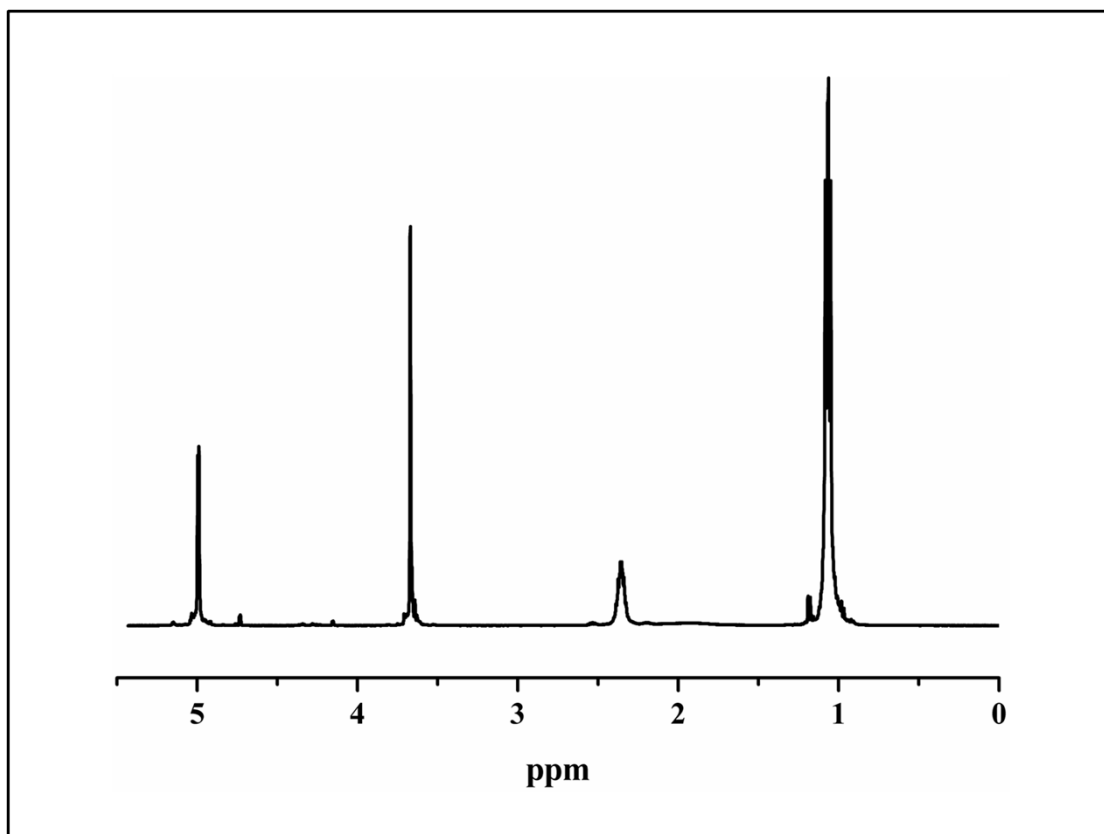


Figure 24. $^1\text{H-NMR}$ spectrum of PDIPG-PEG-PDIPG (16)

^{13}C -NMR Spectra

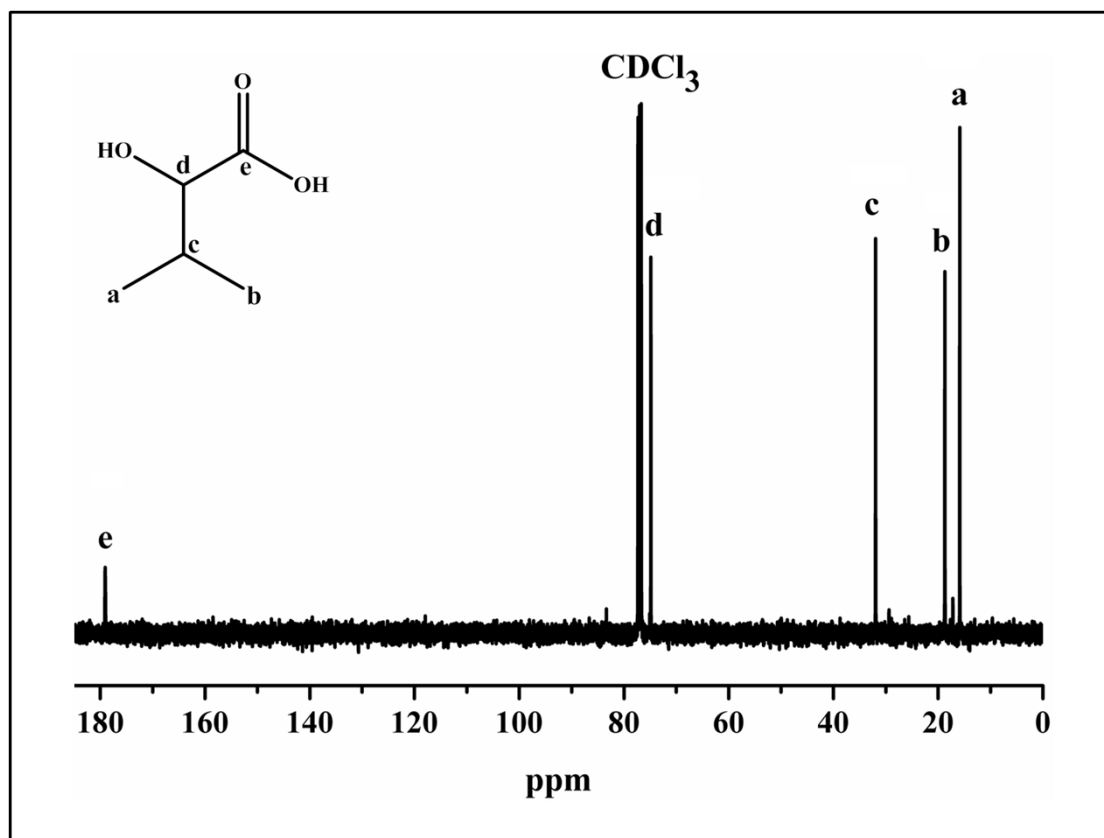


Figure 25. ^{13}C -NMR spectrum of *l*-2-hydroxy-3-methylbutanoic acid (2)

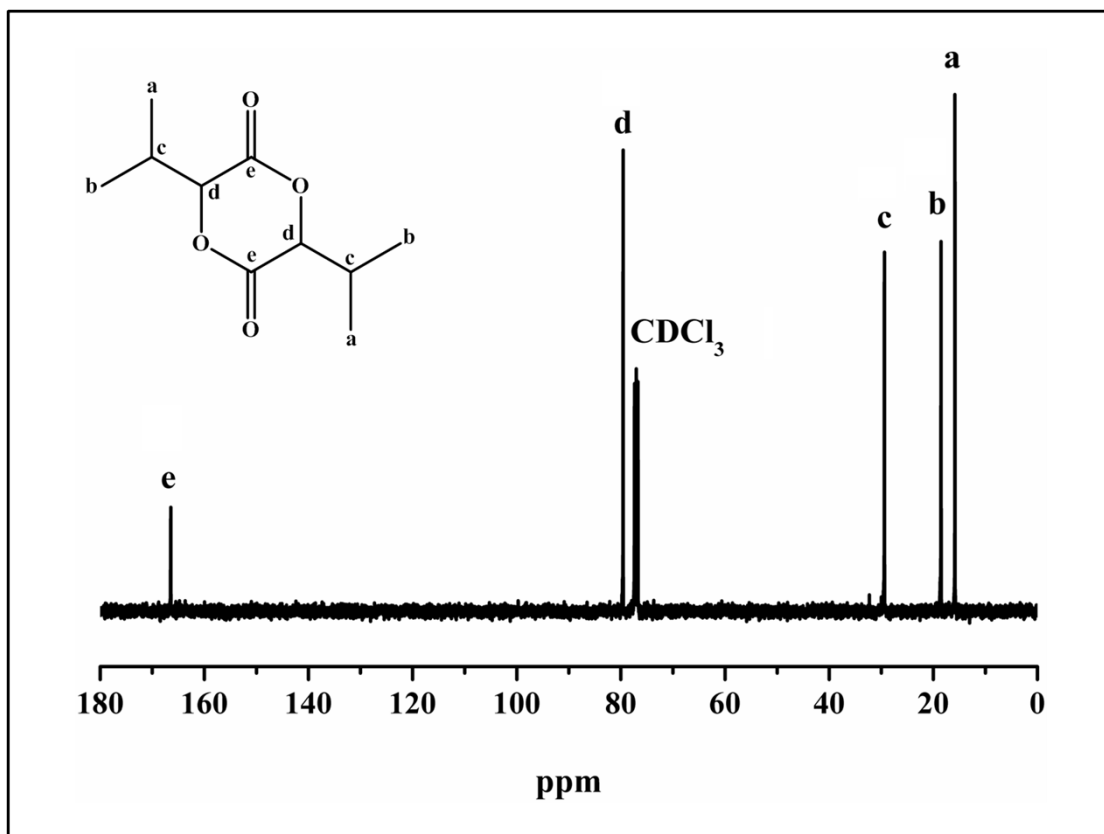


Figure 26. ¹³C-NMR spectrum of *l*-3,6-diisopropyl-1,4-dioxane-2,5-dione (3)

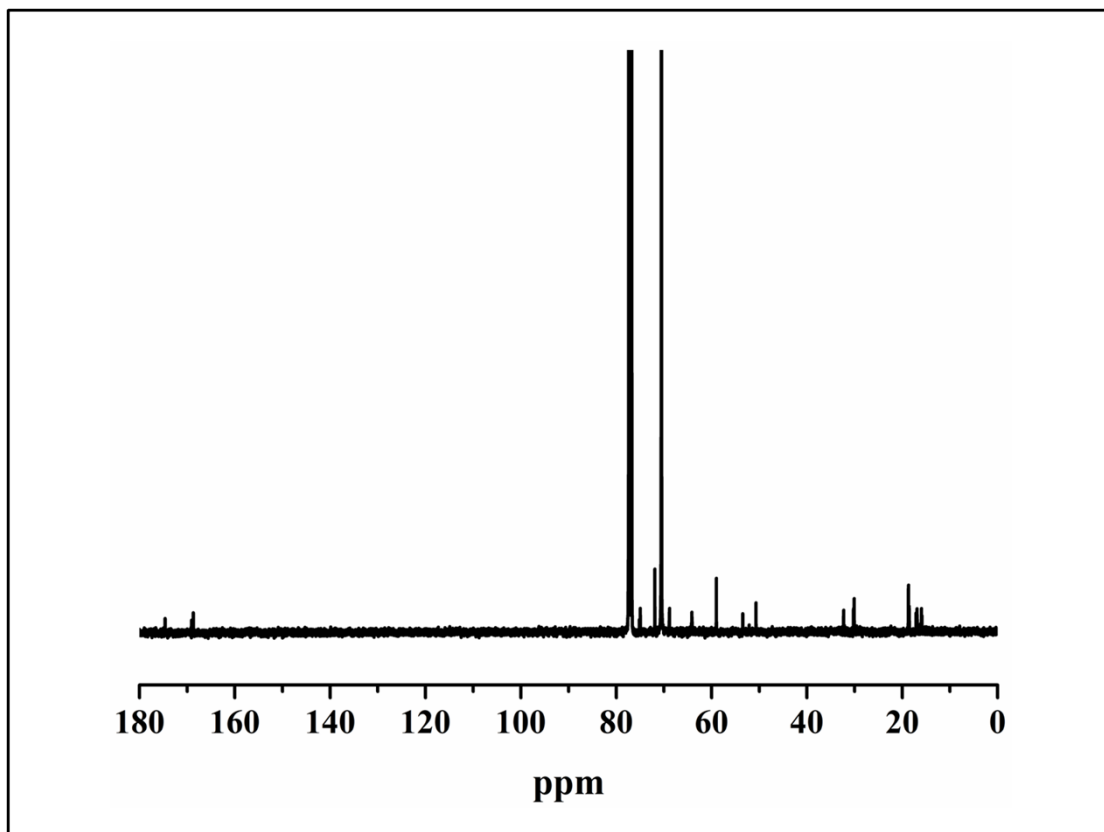


Figure 27. ¹³C-NMR spectrum of MePEG-PDIPG (6)

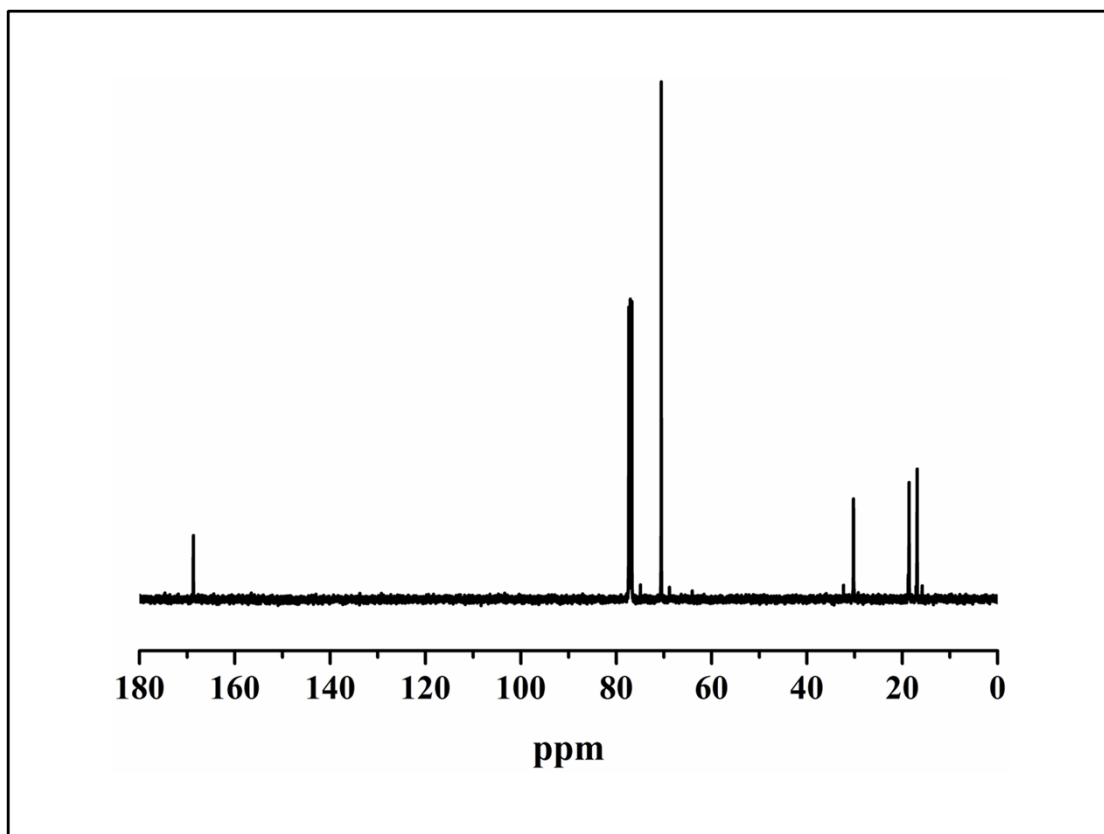


Figure 28. ^{13}C -NMR spectrum of MePEG-PDIPG (7)

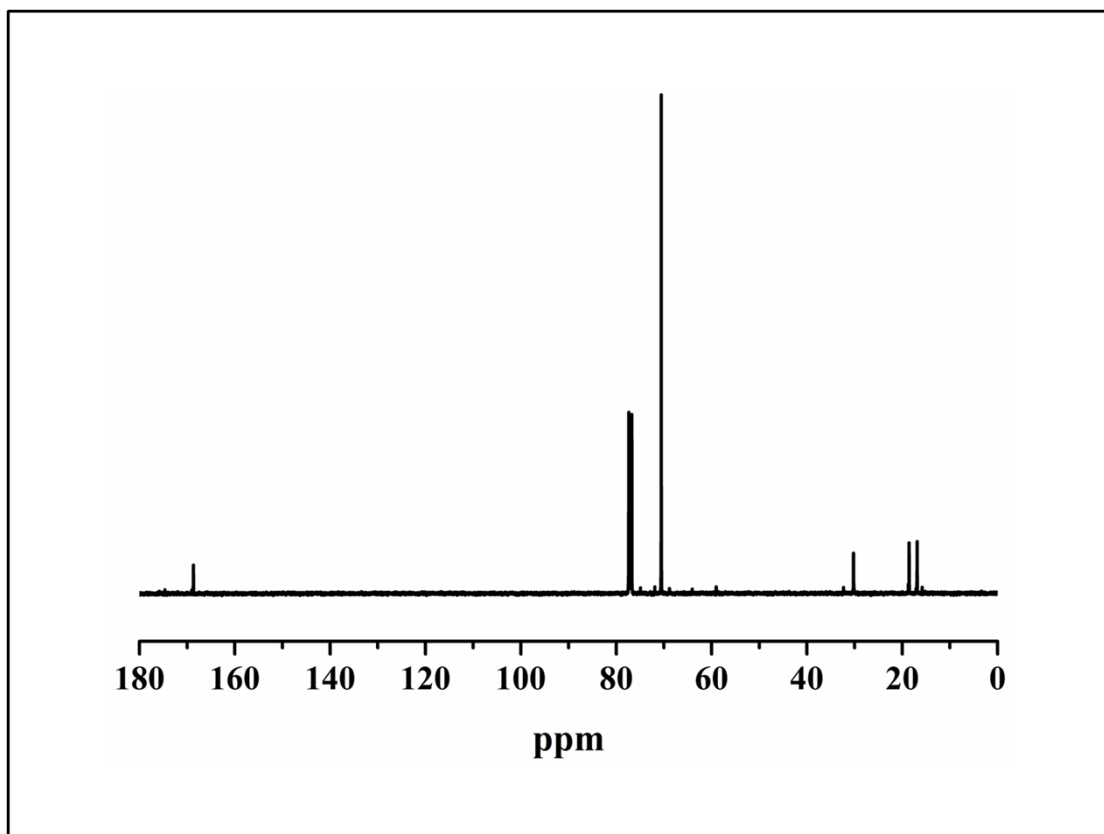


Figure 29. ^{13}C -NMR spectrum of MePEG-PDIPG (8)

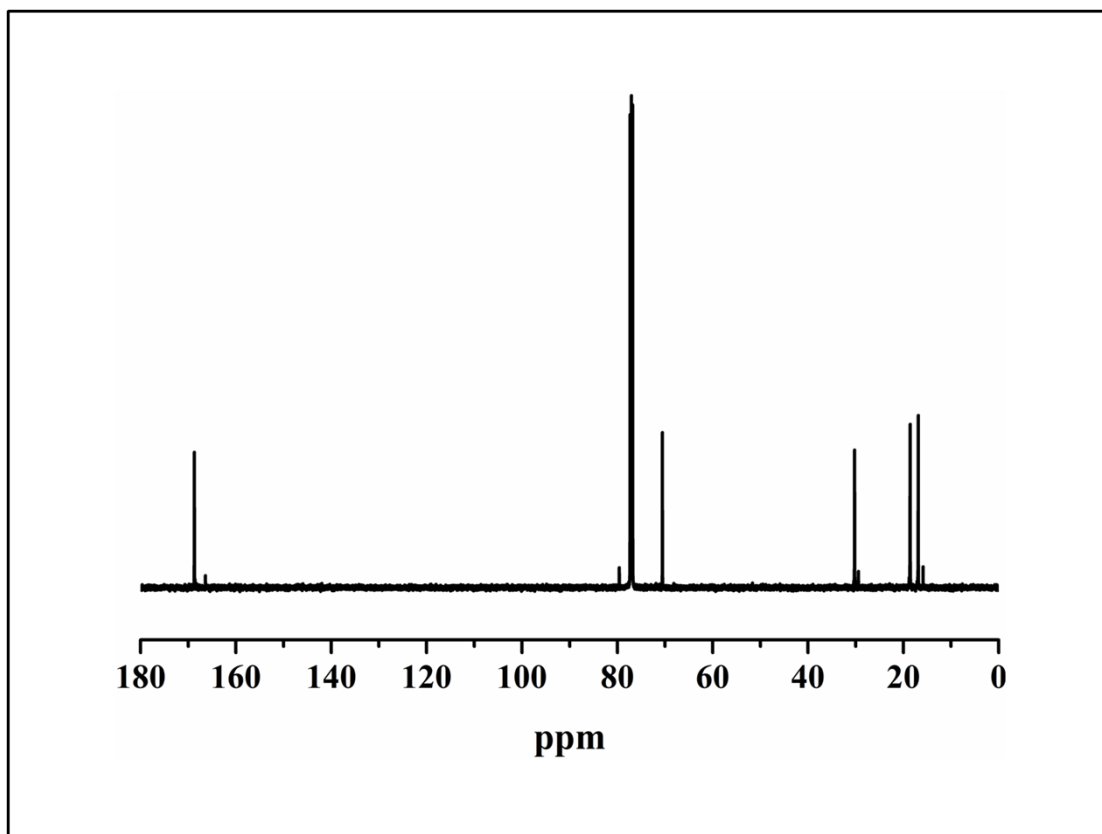


Figure 30. ¹³C-NMR spectrum of MePEG-PDIPG (**10**)

The conversion of the copolymer **10** was about 95.6 % after purification. Therefore, the peaks of 4.4 % monomer were observed in NMR spectrum. The slight carbonyl group at 166.3 ppm, and aliphatic carbon peaks at 79.8, 29.3, 15.7 ppm came from the DIPG monomer.

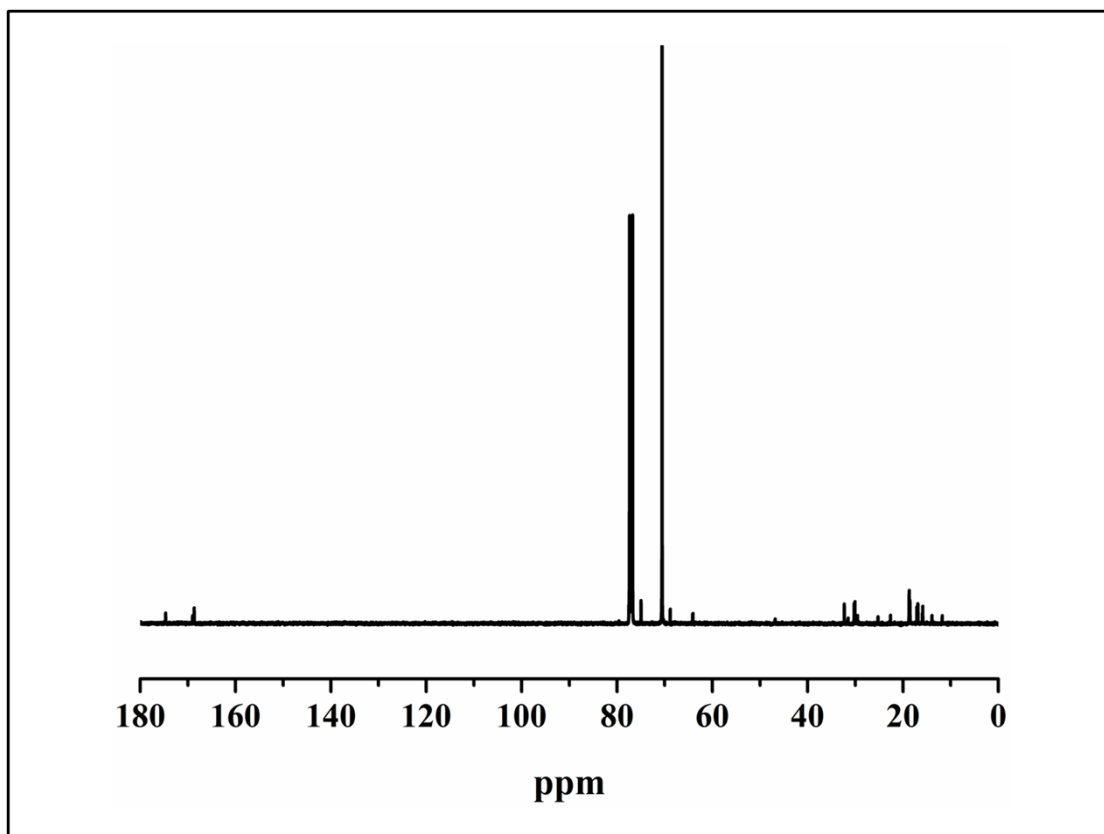


Figure 31. ^{13}C -NMR spectrum of PDIPG-PEG-PDIPG (11)

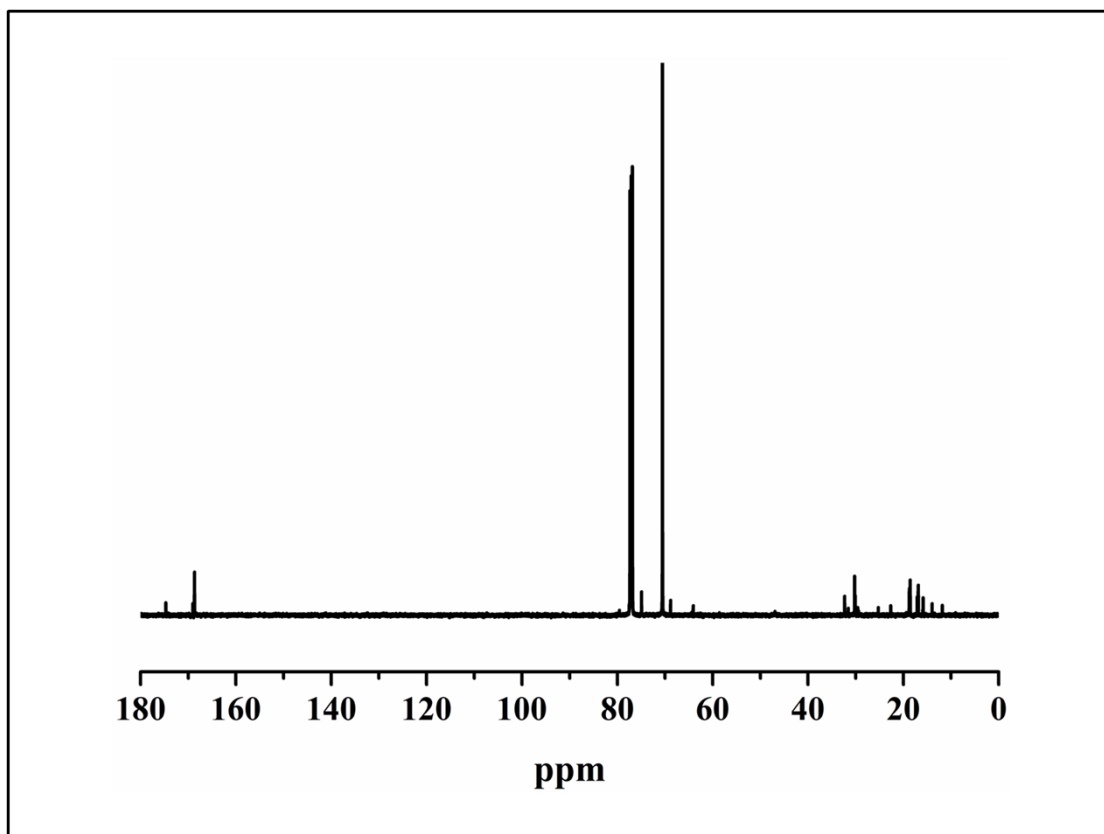


Figure 32. ^{13}C -NMR spectrum of PDIPG-PEG-PDIPG (12)

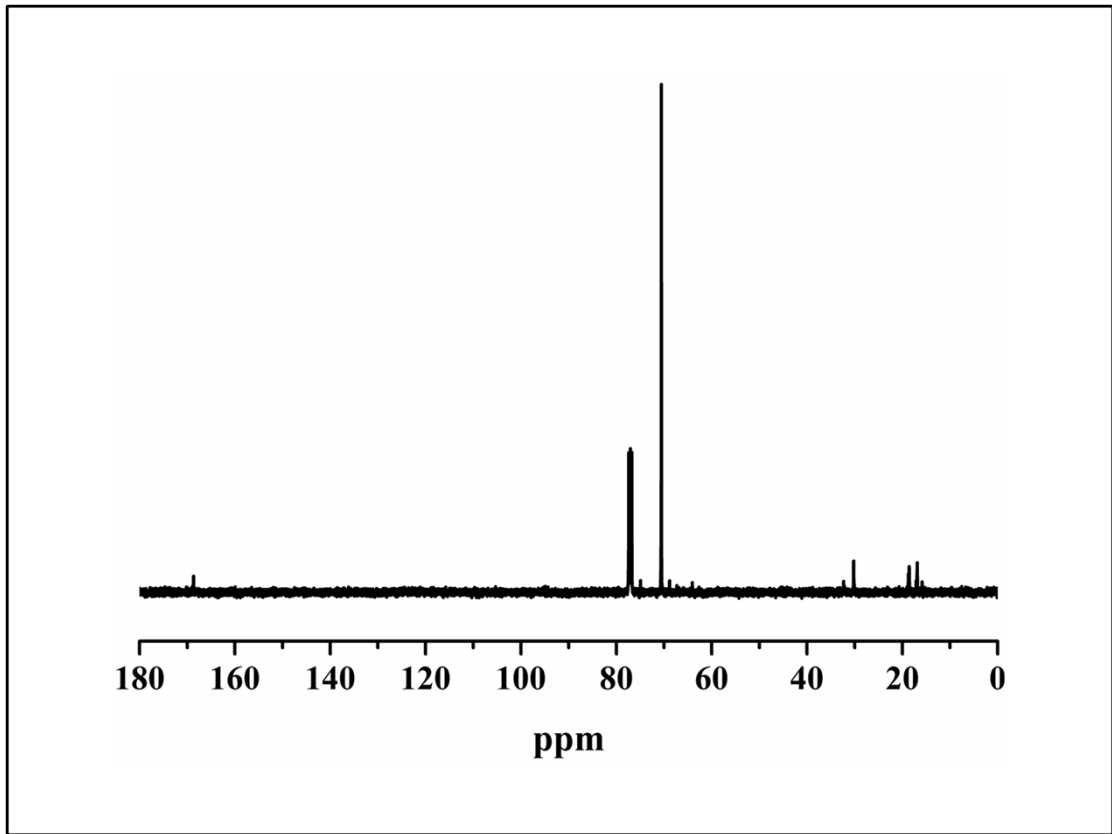


Figure 33. ^{13}C -NMR spectrum of PDIPG-PEG-PDIPG (13)

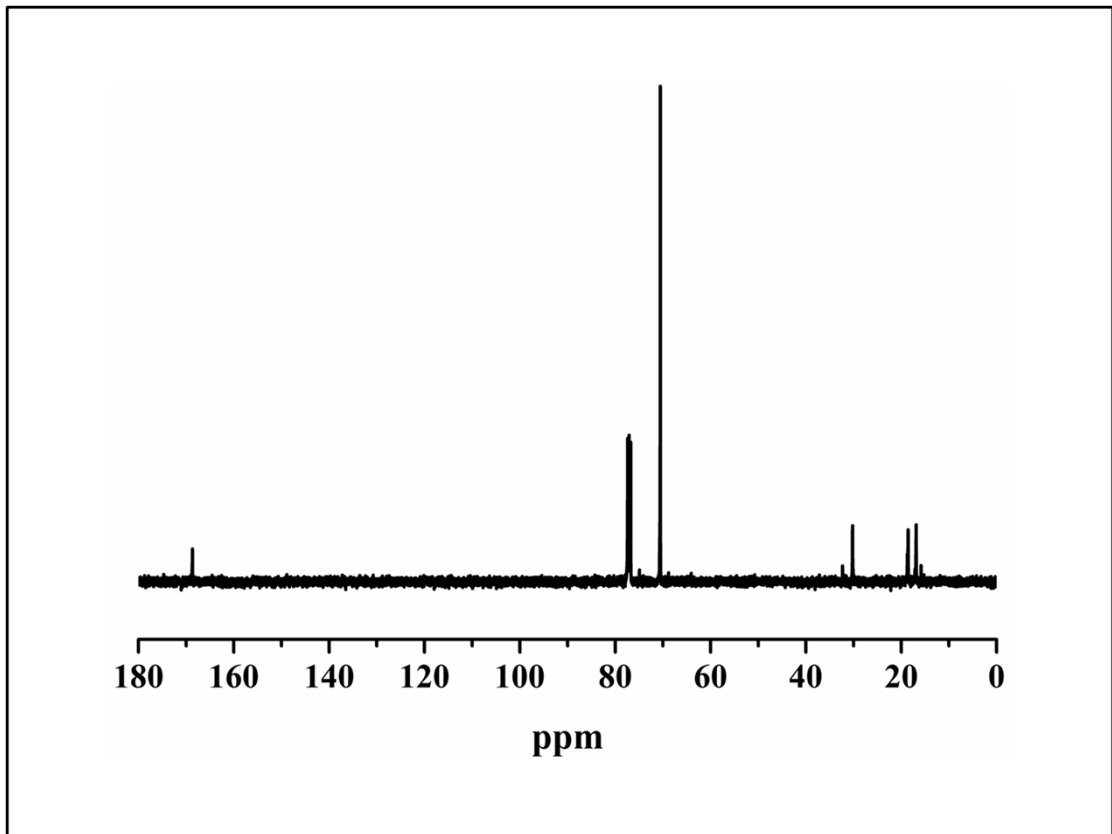


Figure 34. ^{13}C -NMR spectrum of PDIPG-PEG-PDIPG (14)

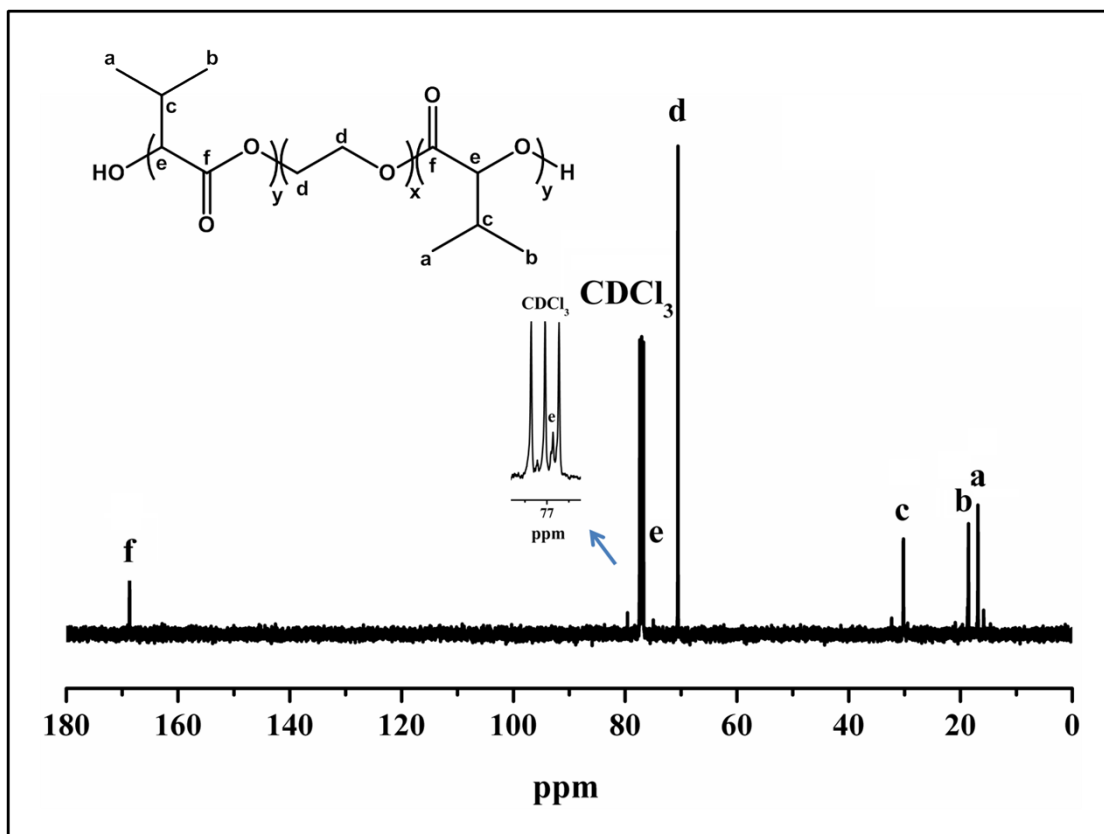


Figure 35. ¹³C-NMR spectrum of PDIPG-PEG-PDIPG (15)

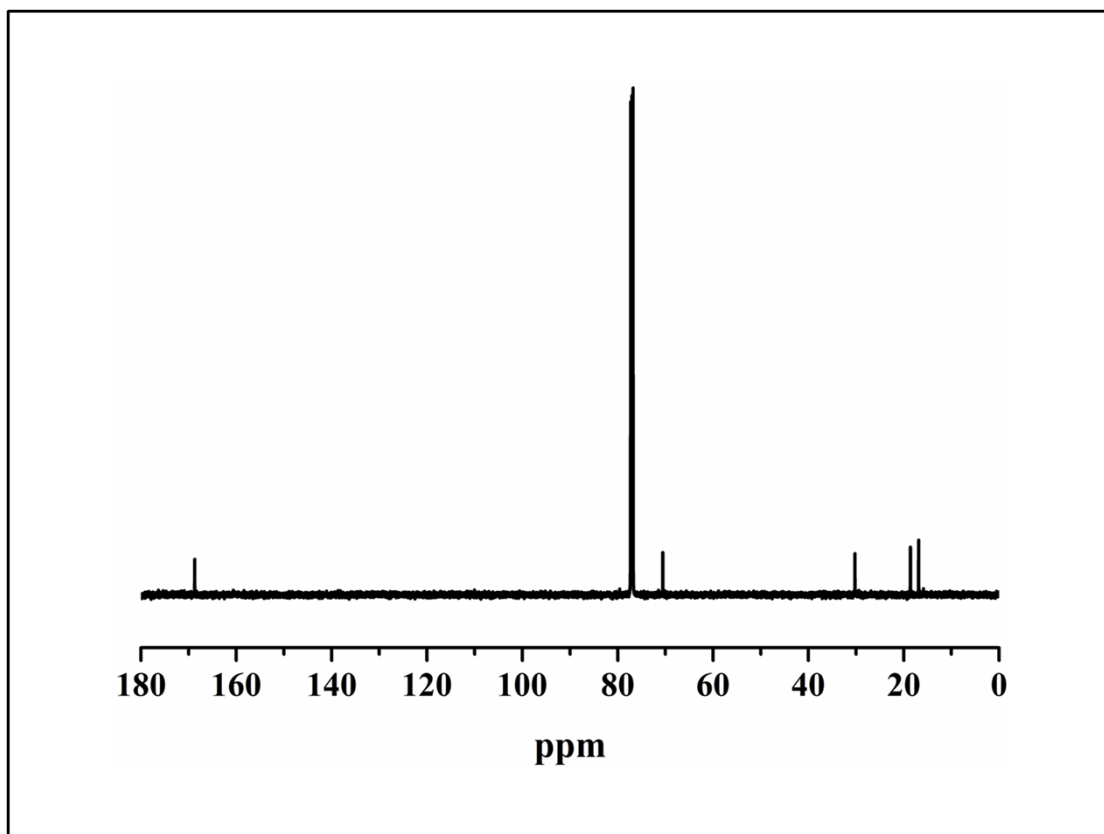


Figure 36. ¹³C-NMR spectrum of PDIPG-PEG-PDIPG (16)

GPC Chromatogram

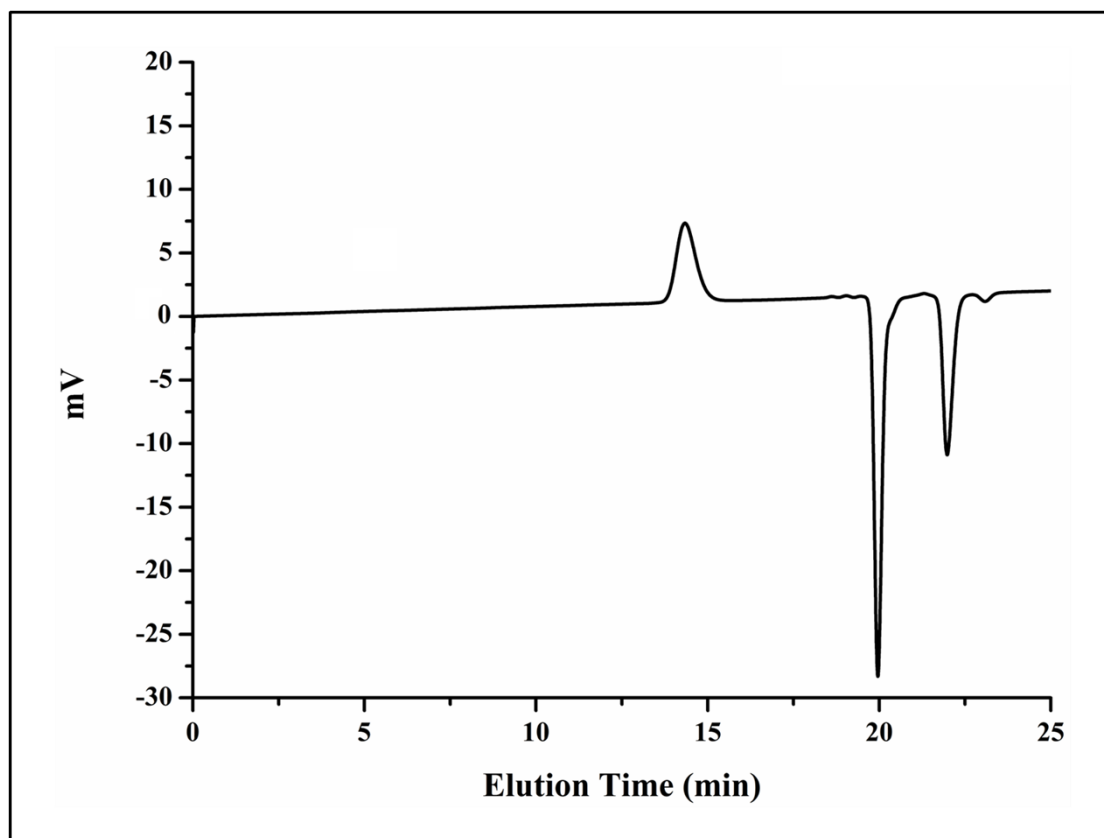


Figure 37. GPC chromatogram of MePEG-PDIPG (6)

Table 1. Peak table for MePEG-PDIPG (6)

| Peak | Retention Time | Area | Height | Peak Start | Peak End | Area% |
|------|----------------|--------|--------|------------|----------|-------|
| 1 | 14.3 | 253104 | 6220 | 13.3 | 15.7 | 98.5 |
| 2 | 18.6 | 1541 | 103 | 18.4 | 18.8 | 0.6 |
| 3 | 19.1 | 2189 | 147 | 18.8 | 19.3 | 0.9 |

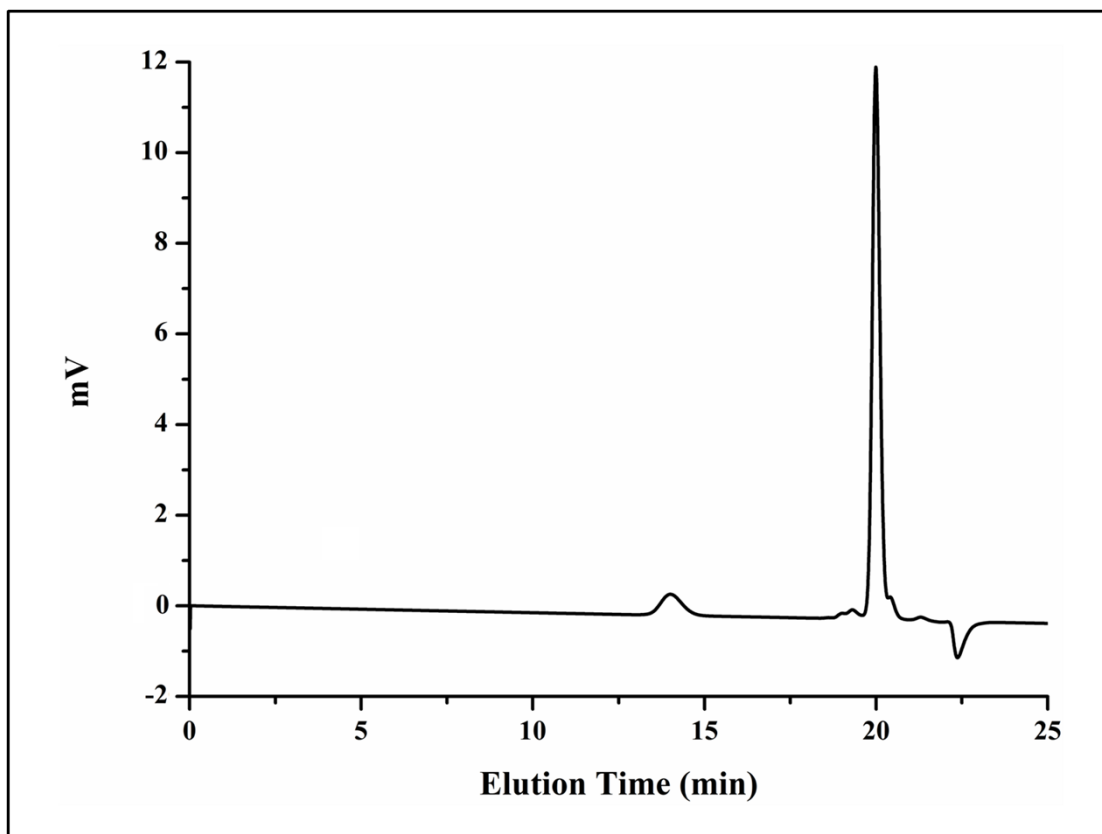


Figure 38. GPC chromatogram of MePEG-PDIPG (7)

Table 2. Peak table for MePEG-PDIPG (7)

| Peak | Retention Time | Area | Height | Peak Start | Peak End | Area% |
|------|----------------|--------|--------|------------|----------|-------|
| 1 | 14.1 | 207717 | 4668 | 12.9 | 15.3 | 98.5 |
| 2 | 18.6 | 636 | 66 | 18.4 | 18.7 | 1.5 |

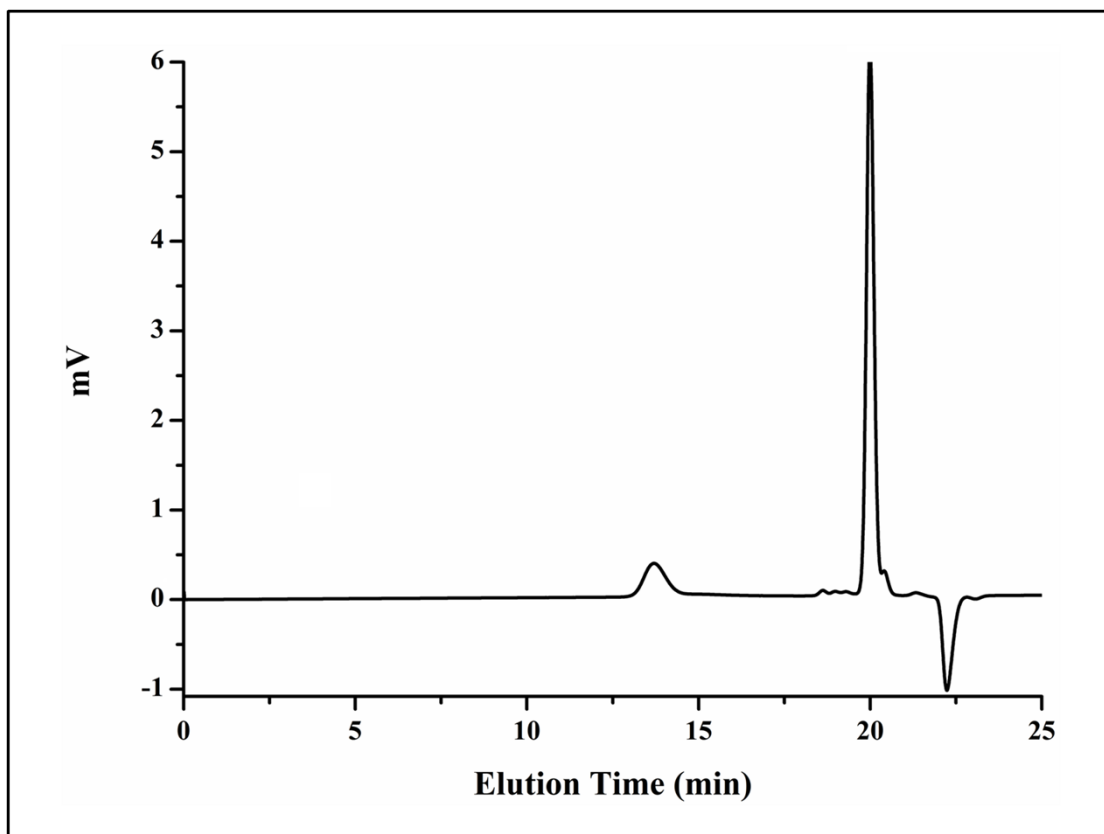


Figure 39. GPC chromatogram of MePEG-PDIPG (8)

Table 3. Peak table for MePEG-PDIPG (8)

| Peak | Retention Time | Area | Height | Peak Start | Peak End | Area% |
|------|----------------|--------|--------|------------|----------|-------|
| 1 | 13.7 | 180717 | 3706 | 12.7 | 15.9 | 98.2 |
| 2 | 18.6 | 5522 | 442 | 18.4 | 18.8 | 1.8 |

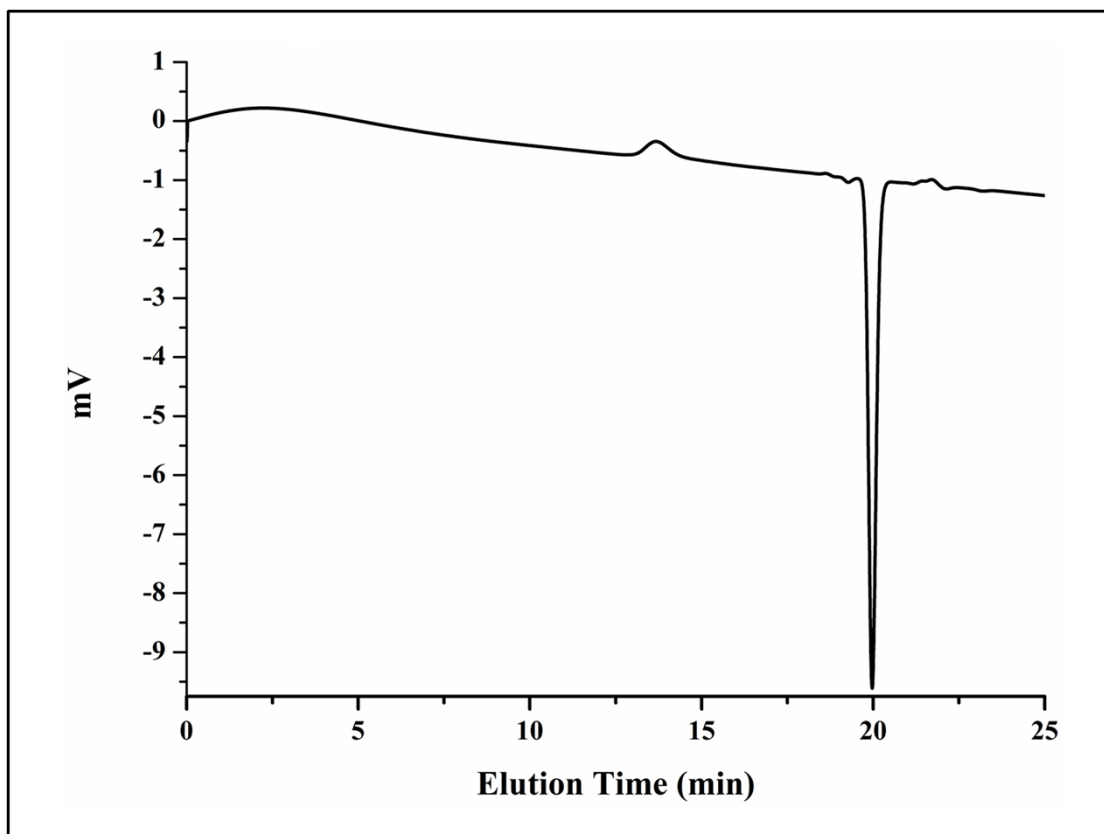


Figure 40. GPC chromatogram of MePEG-PDIPG (9)

Table 4. Peak table for MePEG-PDIPG (9)

| Peak | Retention Time | Area | Height | Peak Start | Peak End | Area% |
|------|----------------|--------|--------|------------|----------|-------|
| 1 | 13.6 | 133371 | 2654 | 12.6 | 14.9 | 97.6 |
| 2 | 18.6 | 3345 | 257 | 18.4 | 18.8 | 2.4 |

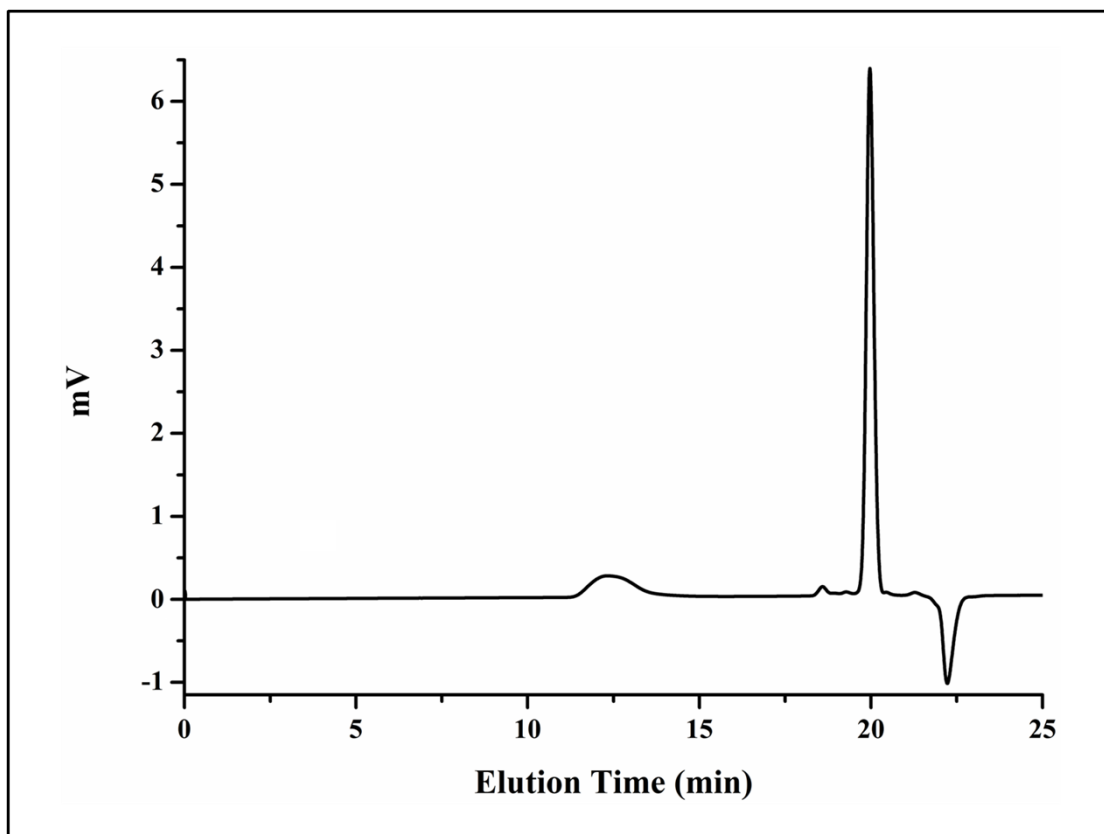


Figure 41. GPC chromatogram of MePEG-PDIPG (10)

Table 5. Peak table for MePEG-PDIPG (10)

| Peak | Retention Time | Area | Height | Peak Start | Peak End | Area% |
|------|----------------|--------|--------|------------|----------|-------|
| 1 | 12.3 | 203661 | 2444 | 11.3 | 14 | 93.5 |
| 2 | 18.6 | 14166 | 949 | 18.2 | 18.9 | 6.5 |

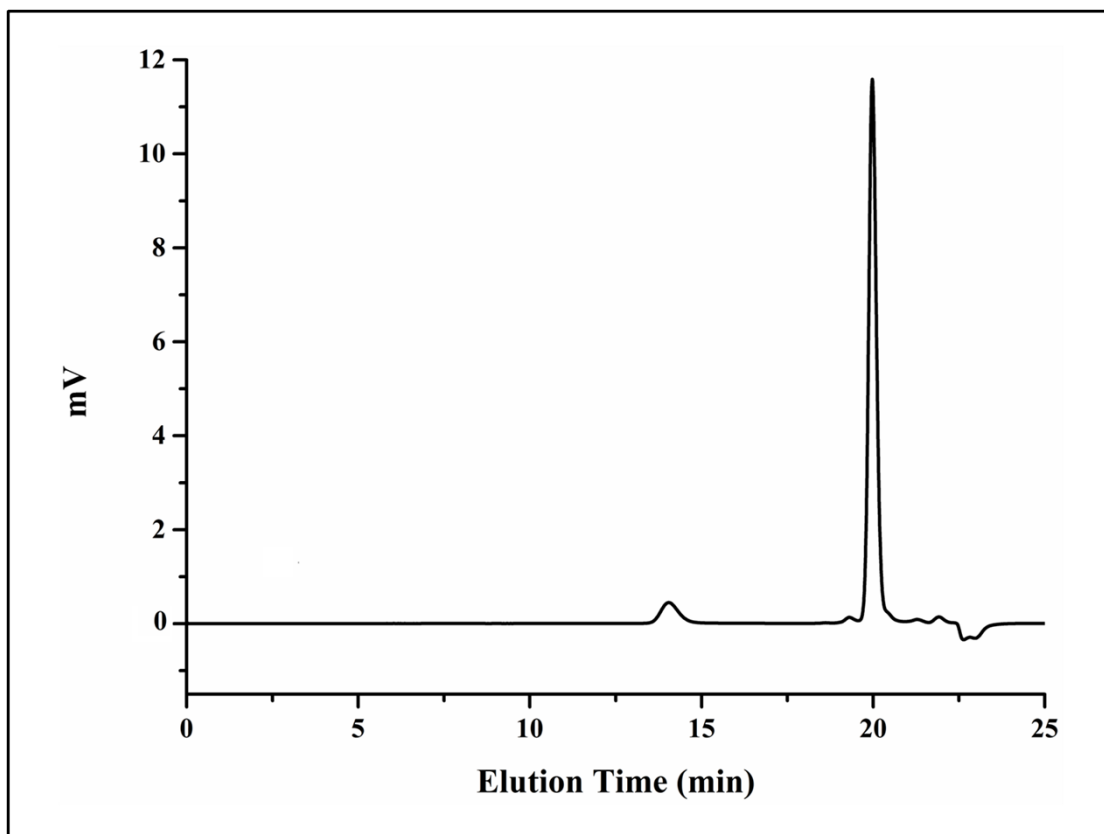


Figure 42. GPC chromatogram of PDIPG-PEG-PDIPG (11)

Table 6. Peak table for PDIPG-PEG-PDIPG (11)

| Peak | Retention Time | Area | Height | Peak Start | Peak End | Area% |
|------|----------------|--------|--------|------------|----------|-------|
| 1 | 13.9 | 163083 | 4410 | 13.2 | 15.2 | 97.8 |
| 2 | 18.6 | 1016 | 82 | 18.4 | 18.9 | 2.2 |

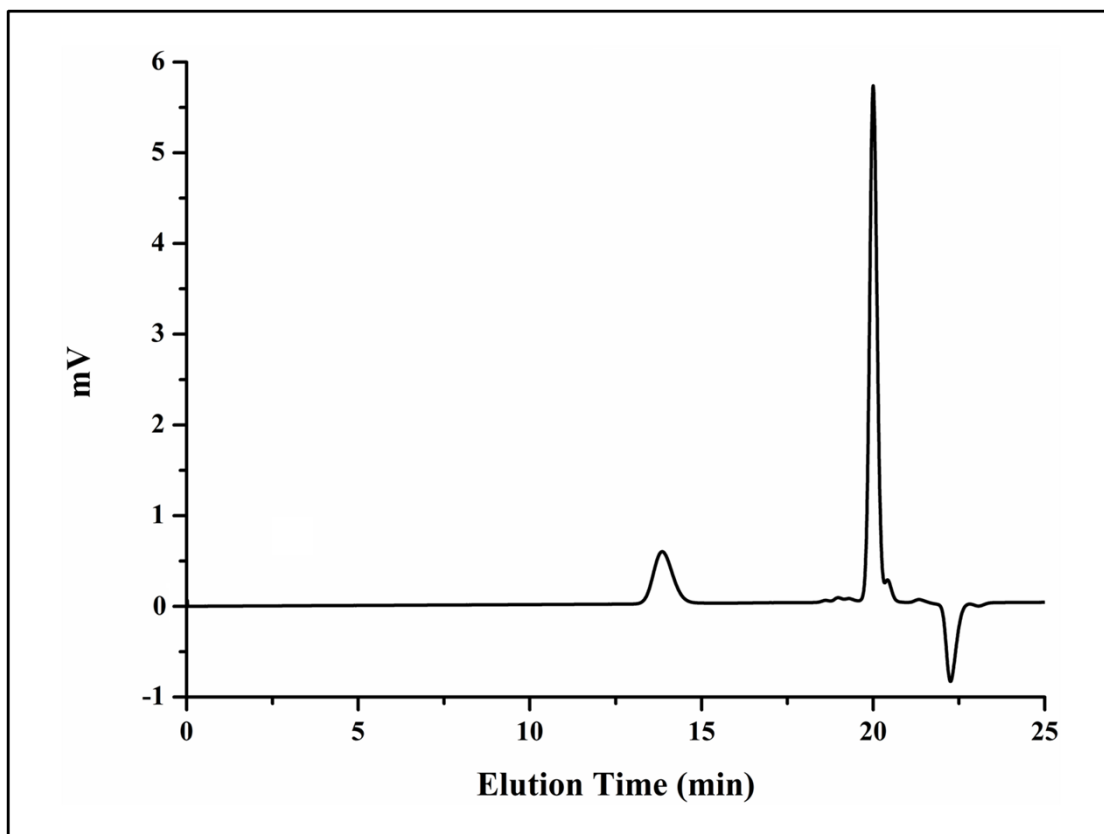


Figure 43. GPC chromatogram of PDIPG-PEG-PDIPG (12)

Table 7. Peak table for PDIPG-PEG-PDIPG (12)

| Peak | Retention Time | Area | Height | Peak Start | Peak End | Area% |
|------|----------------|--------|--------|------------|----------|-------|
| 1 | 13.8 | 228437 | 5742 | 13.1 | 15.1 | 99.3 |
| 2 | 18.6 | 1509 | 126 | 18.4 | 18.8 | 0.7 |

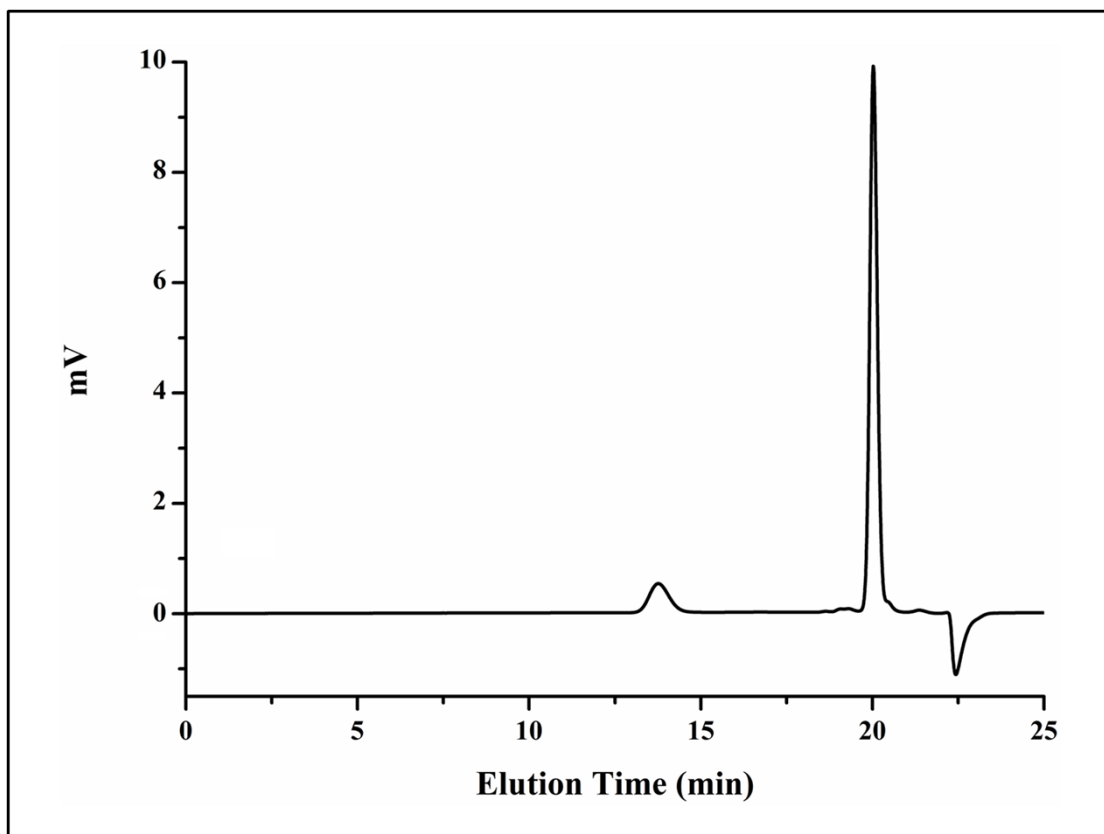


Figure 44. GPC chromatogram of PDIPG-PEG-PDIPG (13)

Table 8. Peak table for PDIPG-PEG-PDIPG (13)

| Peak | Retention Time | Area | Height | Peak Start | Peak End | Area% |
|------|----------------|--------|--------|------------|----------|-------|
| 1 | 13.7 | 214747 | 5259 | 12.9 | 14.9 | 98.8 |
| 2 | 18.6 | 1377 | 116 | 18.3 | 18.8 | 1.2 |

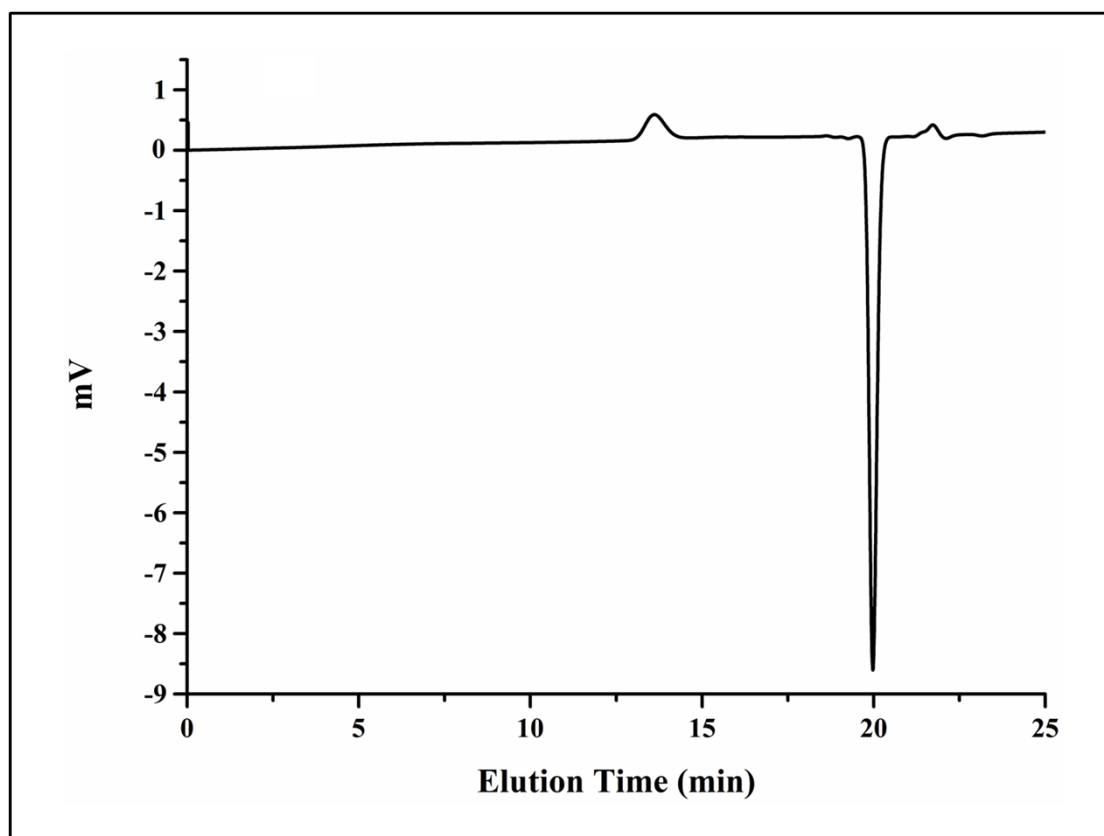


Figure 45. GPC chromatogram of PDIPG-PEG-PDIPG (14)

Table 9. Peak table for PDIPG-PEG-PDIPG (14)

| Peak | Retention Time | Area | Height | Peak Start | Peak End | Area% |
|------|----------------|--------|--------|------------|----------|-------|
| 1 | 13.6 | 172435 | 4133 | 12.6 | 14.9 | 98.4 |
| 2 | 18.6 | 2843 | 194 | 18.4 | 18.8 | 1.6 |

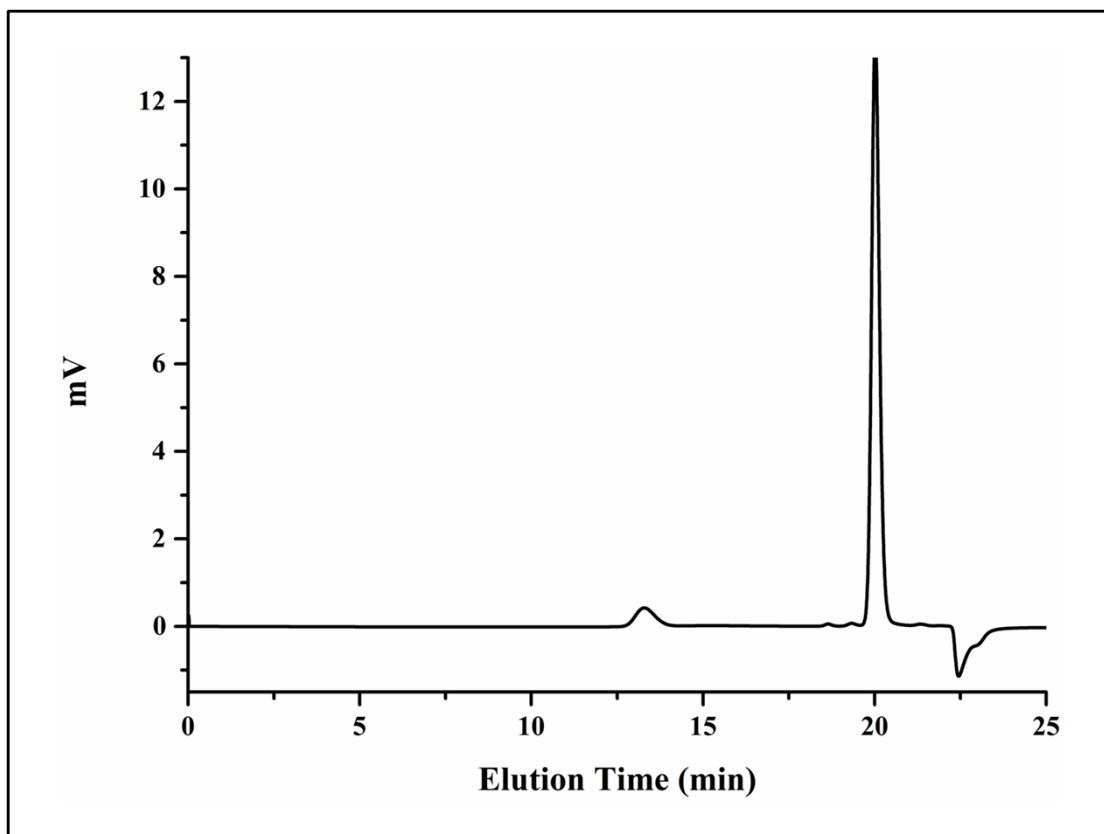


Figure 46. GPC chromatogram of PDIPG-PEG-PDIPG (15)

Table 10. Peak table for PDIPG-PEG-PDIPG (15)

| Peak | Retention Time | Area | Height | Peak Start | Peak End | Area% |
|------|----------------|--------|--------|------------|----------|-------|
| 1 | 13.3 | 171670 | 4240 | 12.4 | 14.3 | 96.1 |
| 2 | 18.6 | 6987 | 495 | 18.4 | 18.9 | 3.9 |

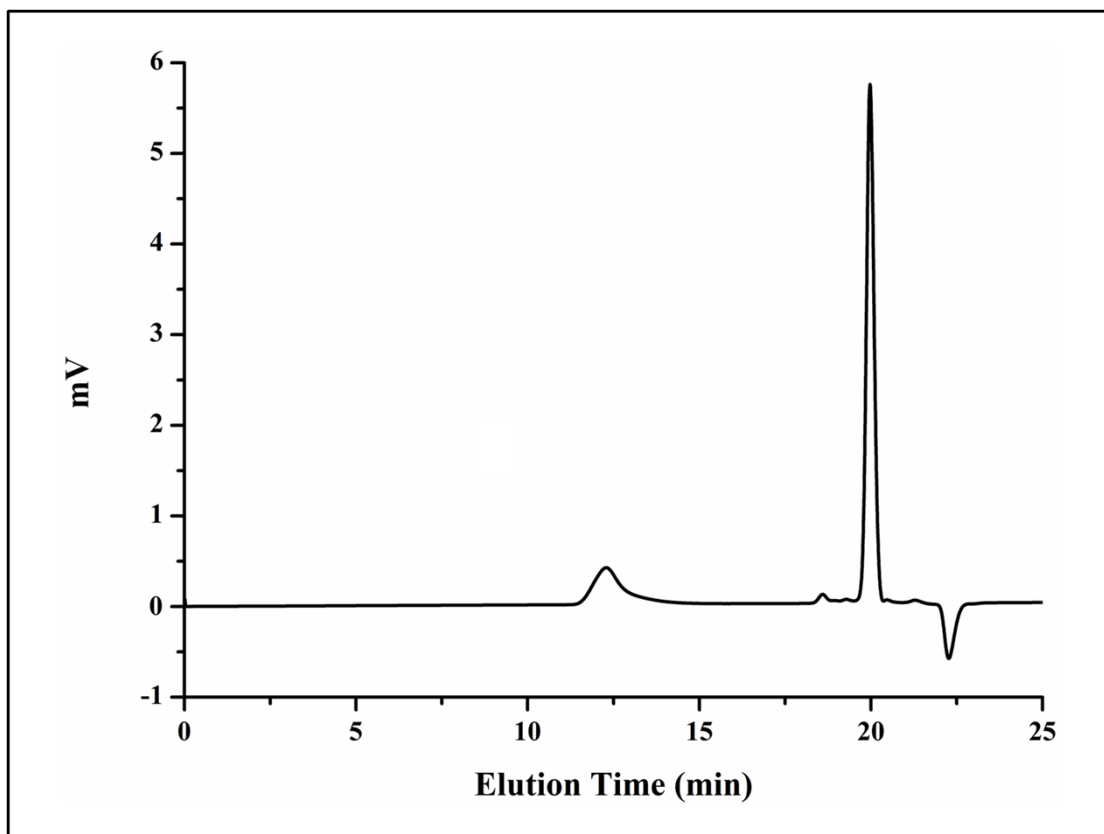


Figure 47. GPC chromatogram of PDIPG-PEG-PDIPG (16)

Table 11. Peak table for PDIPG-PEG-PDIPG (16)

| Peak | Retention Time | Area | Height | Peak Start | Peak End | Area% |
|------|----------------|--------|--------|------------|----------|-------|
| 1 | 12.3 | 209415 | 3817 | 11.5 | 13.9 | 94.7 |
| 2 | 18.6 | 11819 | 806 | 18.2 | 18.8 | 5.3 |