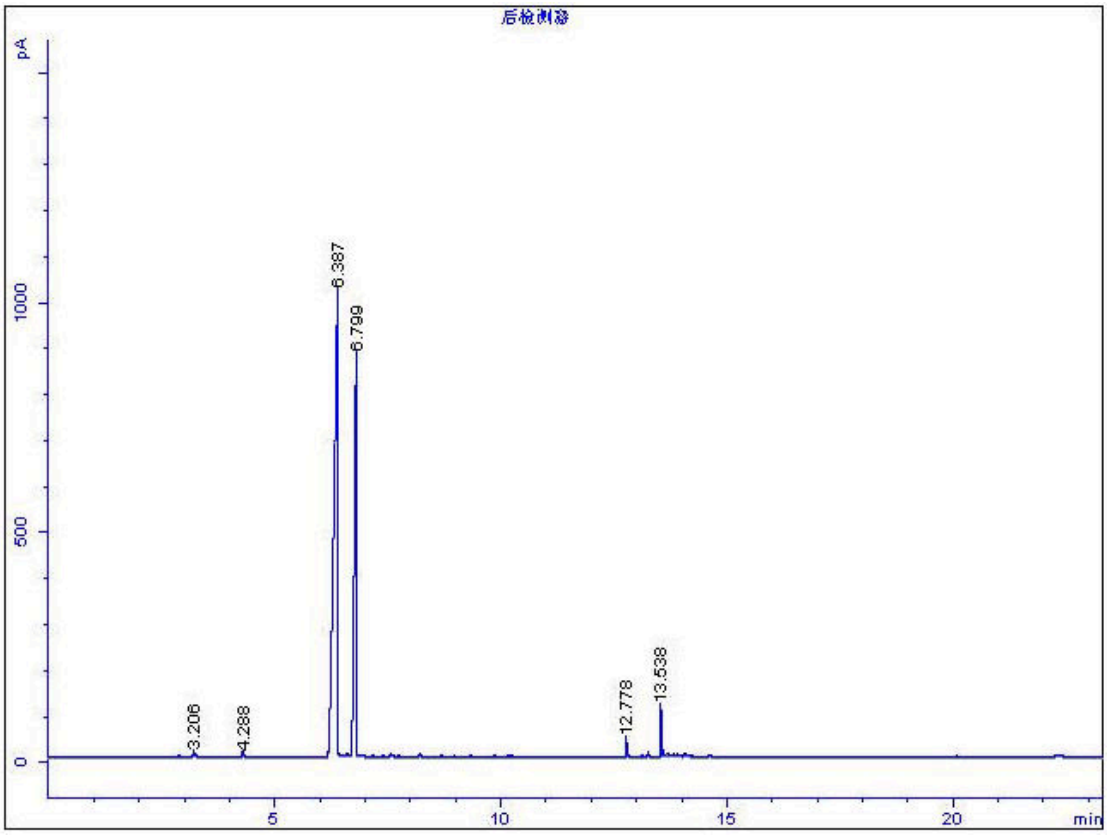
This journal is © The Royal Society of Chemistry 2025

Entry 1



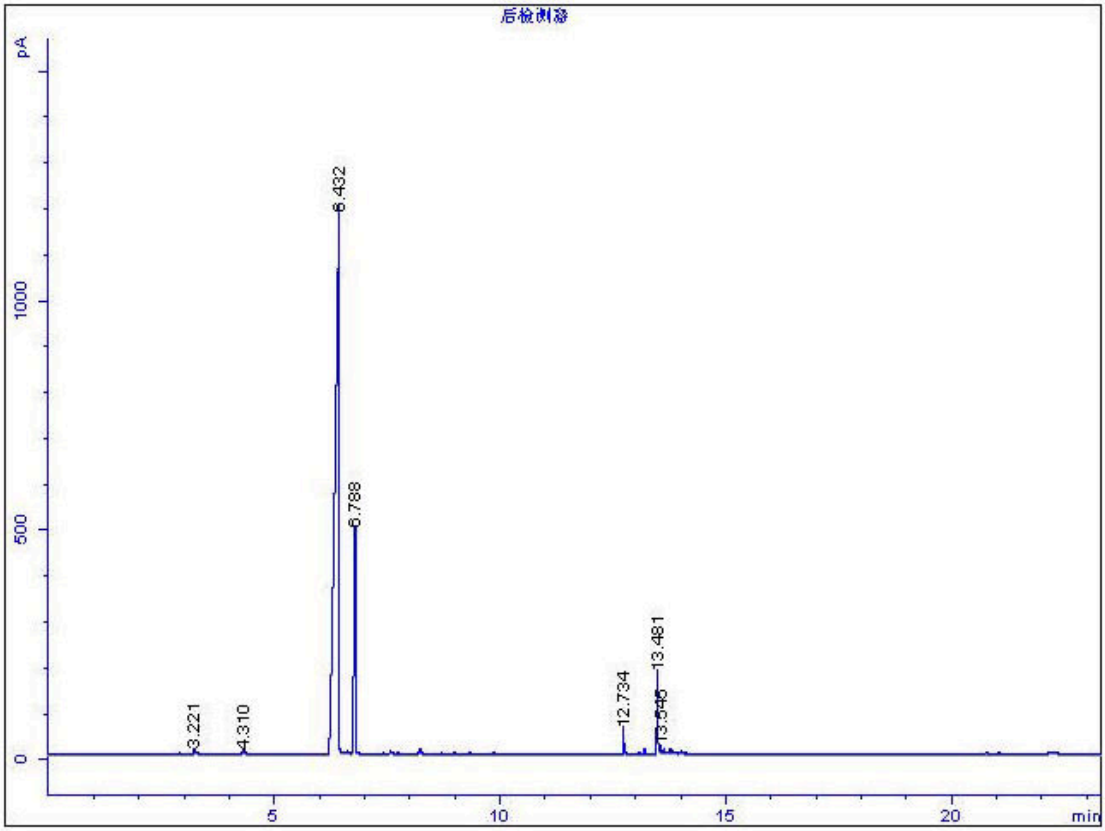
Substance	Retention times (min)	Peak width (min)	Peak area (%)	Response factor	Weight percent (wt%)
styrene	3.206	0.028	0.25	0.92	0.19
benzaldehyde	4.288	0.041	0.24	1.24	0.25
phenylacetaldehyde	6.387	0.078	64.37	1.20	64.69
styrene oxide	6.799	0.044	31.34	1.20	31.49
phenylglycol	12.778	0.020	0.58	1.20	0.58
dimer	13.538	0.024	2.89	1.04	2.52
others	-	-	0.33	1.00	0.28

*Styrene oxide in the raw material: 98.0 wt%

*Conversion of styrene oxide = (98.0-31.49)/98.0*100% ≈ 68%

*Yield of phenylacetaldehyde = 64.69/98.0*100% ≈ 66%

Entry 2



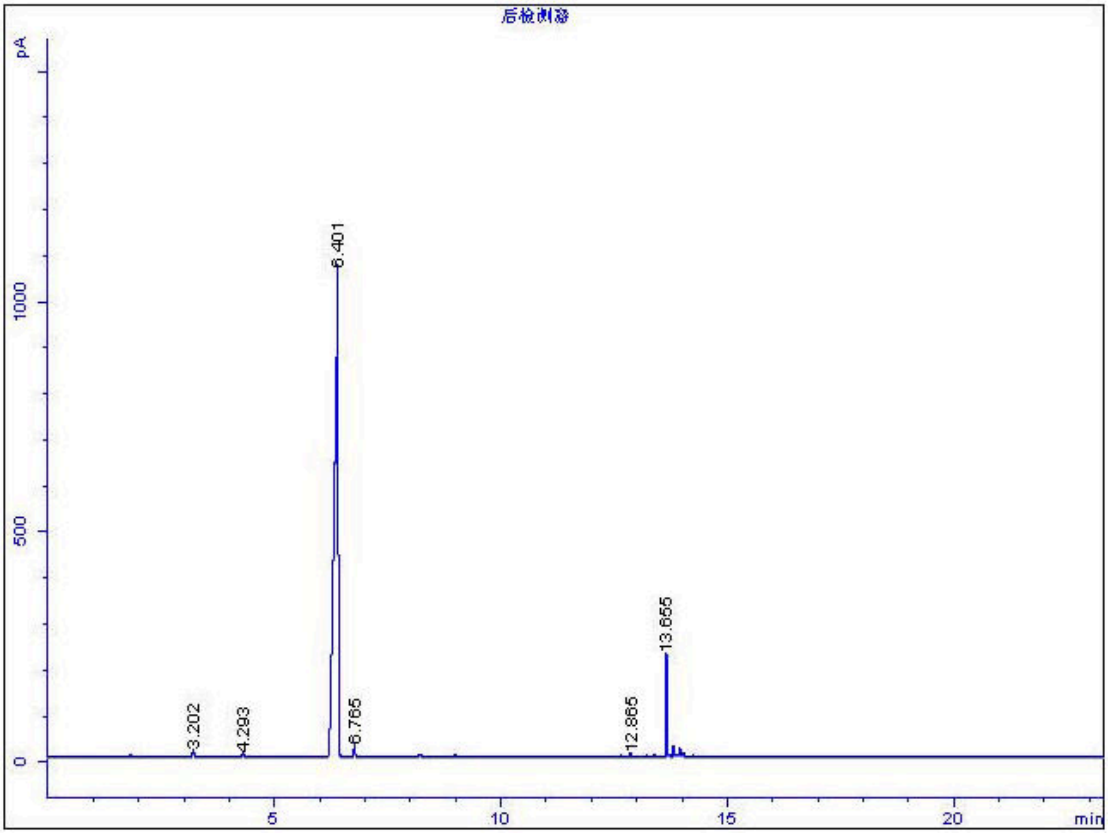
Substance	Retention times (min)	Peak width (min)	Peak area (%)	Response factor	Weight percent (wt%)
styrene	3.221	0.033	0.27	0.92	0.21
benzaldehyde	4.310	0.045	0.25	1.24	0.26
phenylacetaldehyde	6.432	0.081	81.09	1.20	81.63
styrene oxide	6.788	0.038	13.10	1.20	13.19
phenylglycol	12.734	0.018	0.92	1.20	0.93
dimer	13.481	0.023	3.77	1.04	3.29
others	-	-	0.60	1.00	0.50

*Styrene oxide in the raw material: 98.0 wt%

*Conversion of styrene oxide = (98.0-13.19)/98*100% = 87%

*Yield of phenylacetaldehyde = 81.63/98.0*100% ≈ 83%

Entry 3



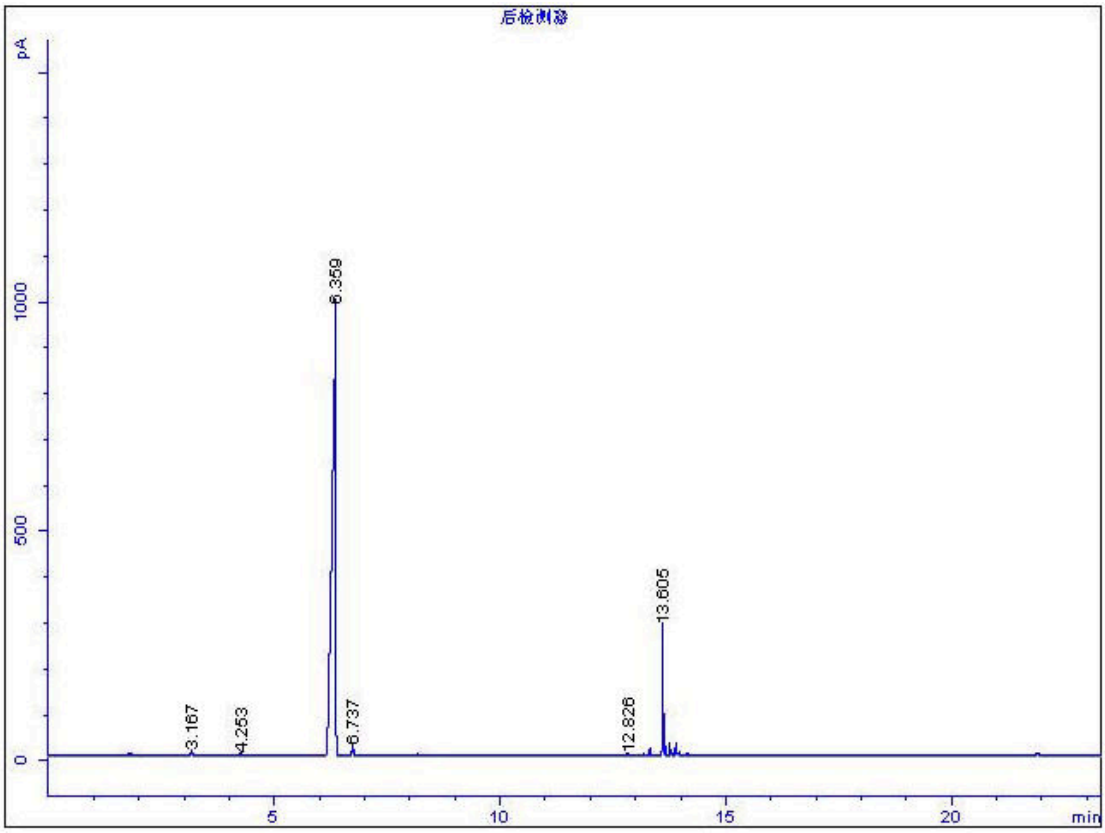
Substance	Retention times (min)	Peak width (min)	Peak area (%)	Response factor	Weight percent (wt%)
styrene	3.202	0.033	0.46	0.92	0.36
benzaldehyde	4.293	0.051	0.36	1.24	0.38
phenylacetaldehyde	6.401	0.072	89.23	1.20	90.50
styrene oxide	6.765	0.030	0.33	1.20	0.33
phenylglycol	12.865	0.021	0.44	1.20	0.45
dimer	13.655	0.019	6.74	1.04	5.92
others	-	-	2.44	1.00	2.06

*Styrene oxide in the raw material: 98.0 wt%

*Conversion of styrene oxide = (98.0-0.33)/98.0*100% ≈ 100%

*Yield of phenylacetaldehyde = 90.50/98.0*100% ≈ 92%

Entry 4



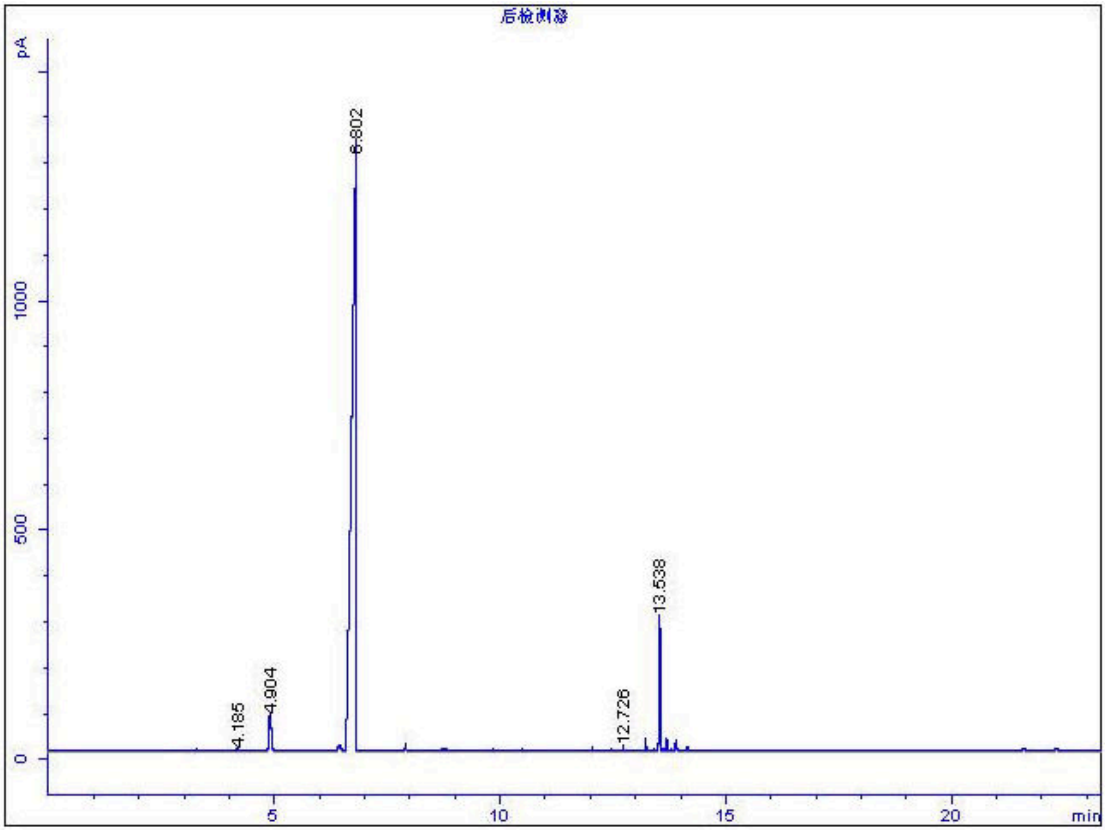
Substance	Retention times (min)	Peak width (min)	Peak area (%)	Response factor	Weight percent (wt%)
styrene	3.167	0.039	0.45	0.92	0.35
benzaldehyde	4.253	0.047	0.37	1.24	0.39
phenylacetaldehyde	6.359	0.073	86.07	1.20	87.27
styrene oxide	6.737	0.032	0.32	1.20	0.32
phenylglycol	12.826	0.020	0.50	1.20	0.51
dimer	13.605	0.023	9.31	1.04	8.18
others	-	-	3.52	1.00	2.97

*Styrene oxide in the raw material: 98.0 wt%

*Conversion of styrene oxide = (98.0-0.32)/98.0*100% ≈ 100%

*Yield of phenylacetaldehyde = 87.27/98.0*100% ≈ 89%

Entry 5



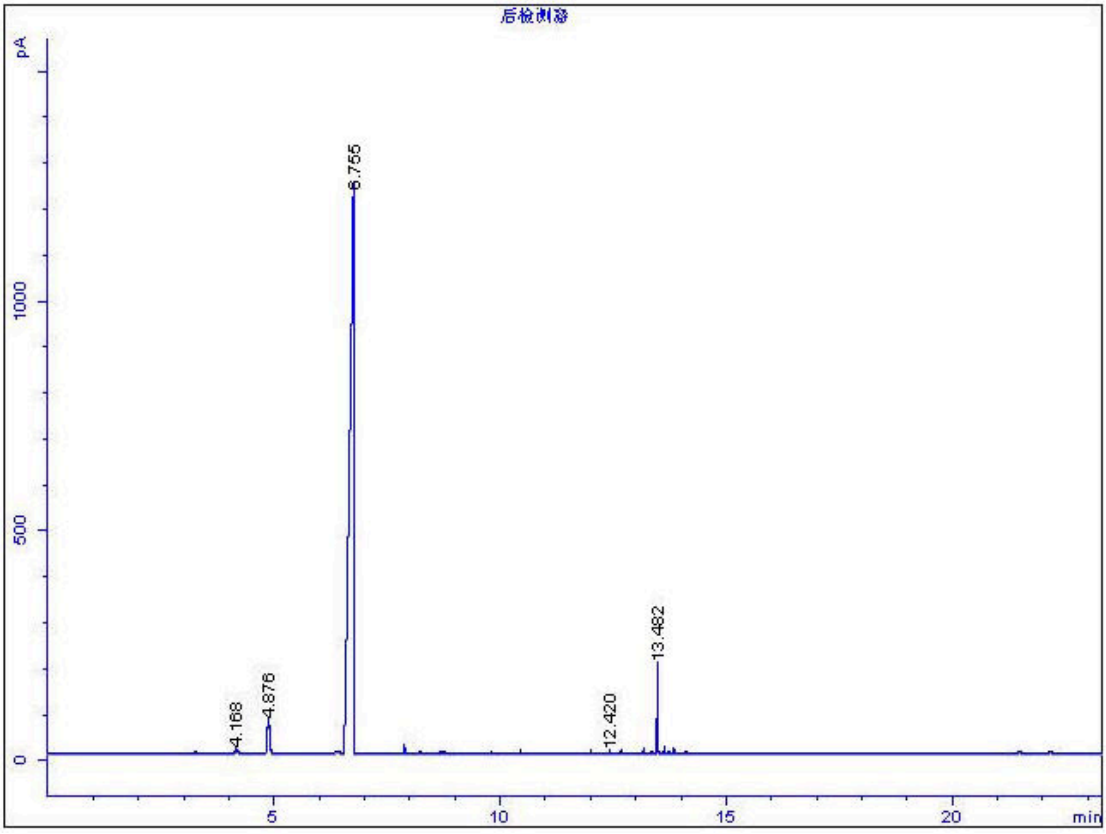
Substance	Retention times (min)	Peak width (min)	Peak area (%)	Response factor	Weight percent (wt%)
4-methyl styrene	4.185	0.058	0.20	0.92	0.16
4-methyl benzaldehyde	4.904	0.062	5.32	1.24	5.60
(4-methylphenyl)acetaldehyde	6.802	0.083	80.15	1.20	81.71
(4-methylphenyl)glycol	12.726	0.020	0.16	1.20	0.16
dimer	13.538	0.023	9.75	1.04	8.61
others	-	-	4.42	1.00	3.75

*4-methyl styrene oxide in the raw material: 95.0 wt%

*Conversion of 4-methyl styrene oxide = (95.0-0.0)/95.0*100% ≈ 100%

*Yield of (4-methylphenyl)acetaldehyde = 81.71/95.0*100% ≈ 86%

Entry 6



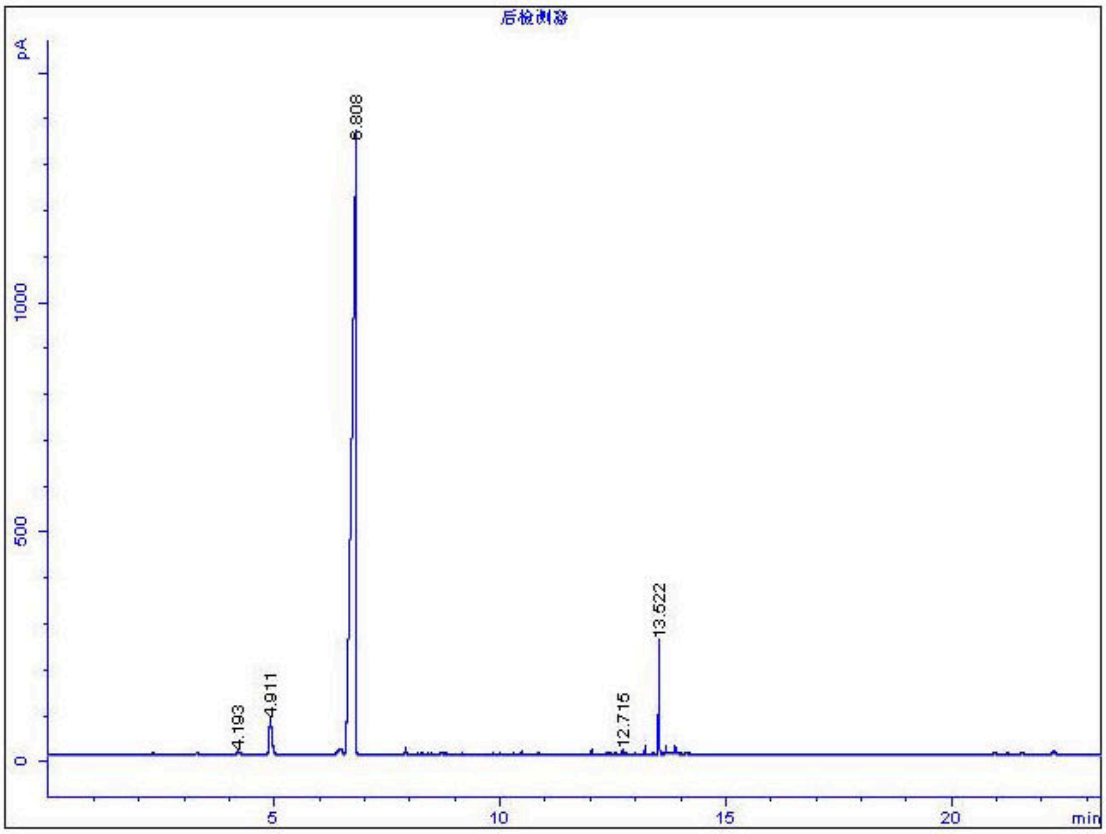
Substance	Retention times (min)	Peak width (min)	Peak area (%)	Response factor	Weight percent (wt%)
4- fluoro styrene	4.168	0.061	0.43	0.92	0.33
4- fluoro benzaldehyde	4.876	0.063	3.46	1.24	3.61
(4-fluorophenyl)acetaldehyde	6.755	0.077	88.58	1.20	89.51
(4-fluorophenyl)glycol	12.420	0.018	0.12	1.20	0.12
dimer	13.482	0.023	5.39	1.04	4.72
others	-	-	2.02	1.00	1.70

*4-fluoro styrene oxide in the raw material: 95.0 wt%

*Conversion of 4-fluoro styrene oxide = (95.0-0.0)/95.0*100% ≈ 100%

*Yield of (4-fluorophenyl)acetaldehyde = 89.51/95.0*100% ≈ 94%

Entry 7



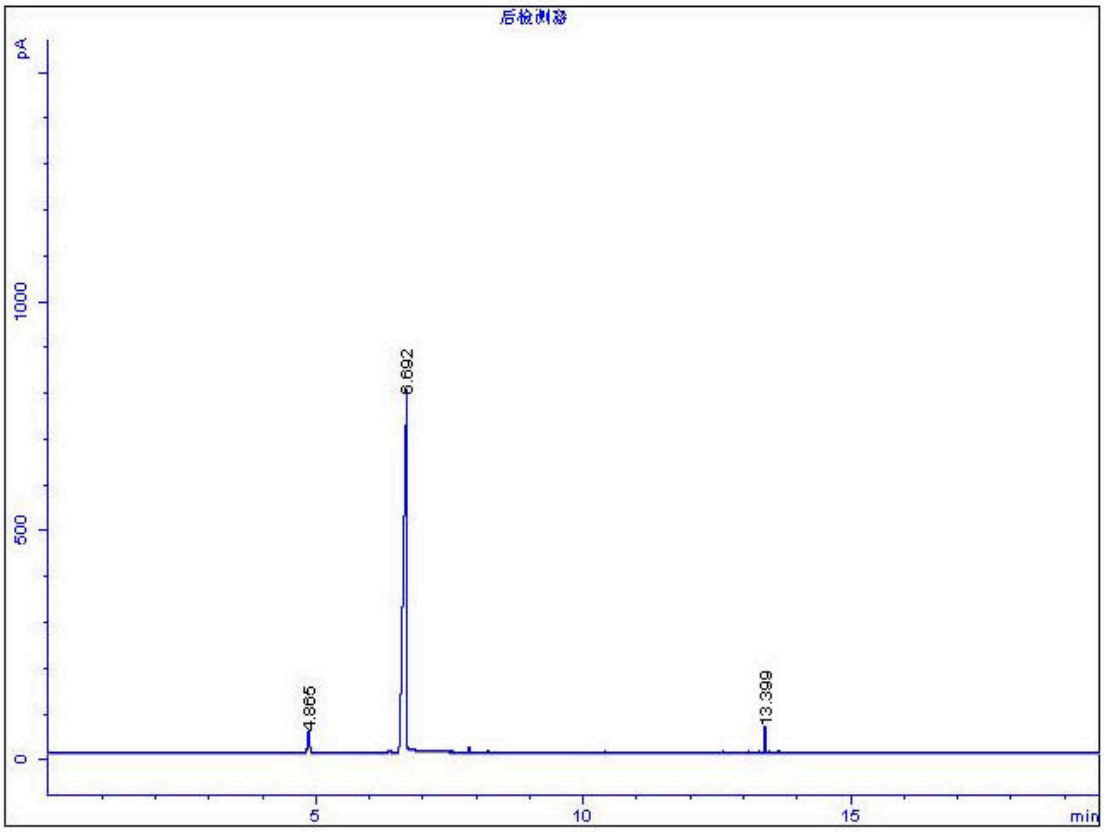
Substance	Retention times (min)	Peak width (min)	Peak area (%)	Response factor	Weight percent (wt%)
4- chlorine styrene	4.193	0.052	0.20	0.92	0.16
4- chlorine benzaldehyde	4.911	0.058	3.25	1.24	3.40
(4- chlorinephenyl)acetaldehyde	6.808	0.084	87.50	1.20	88.50
(4- chlorinephenyl)glycol	12.715	0.020	0.15	1.20	0.15
dimer	13.522	0.023	6.56	1.04	5.75
others	-	-	2.43	1.00	2.05

*4-chlorine styrene oxide in the raw material: 95.0 wt%

*Conversion of 4-chlorine styrene oxide = (95.0-0.0)/95.0*100% ≈ 100%

*Yield of (4-chlorinephenyl)acetaldehyde = 88.50/95.0*100% ≈ 93%

Entry 8



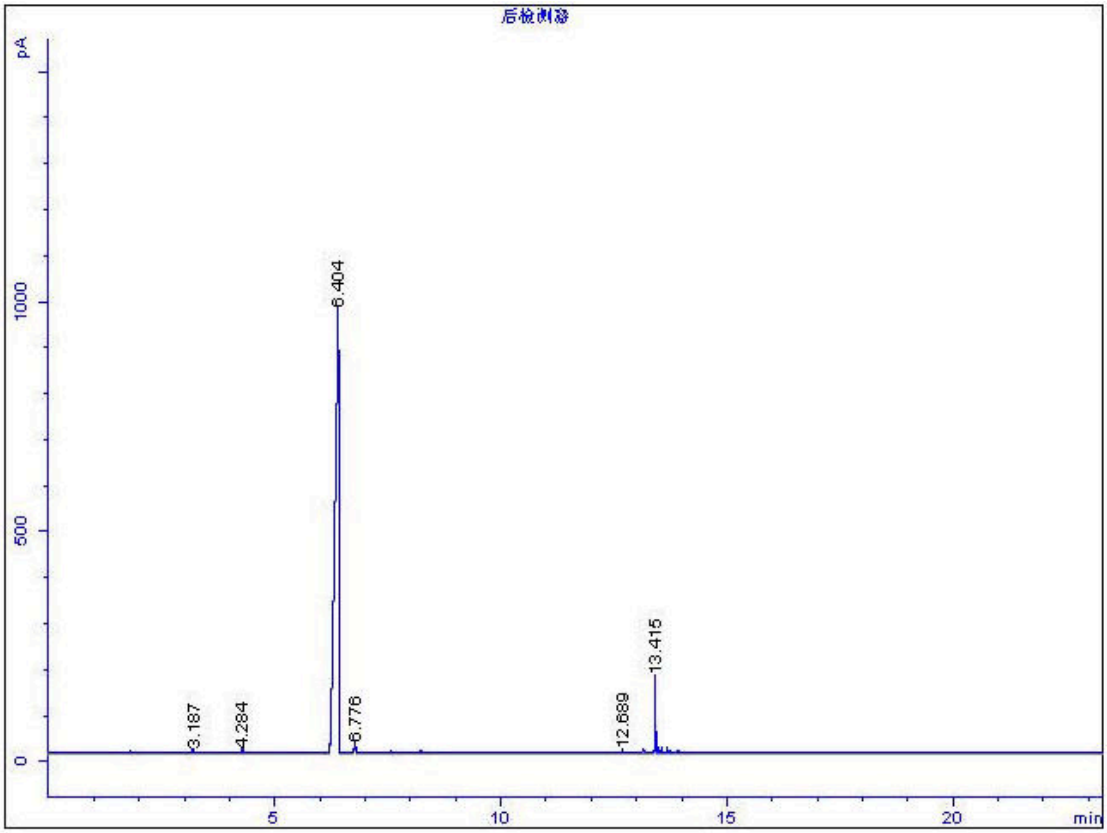
Substance	Retention times (min)	Peak width (min)	Peak area (%)	Response factor	Weight percent (wt%)
4- nitro benzaldehyde	4.865	0.043	3.60	1.24	3.76
(4- nitrophenyl)acetaldehyde	6.692	0.054	88.52	1.20	89.39
dimer	13.399	0.024	6.58	1.04	5.76
others	-	-	1.30	1.00	1.09

*4-fluoro styrene oxide in the raw material: 95.0 wt%

*Conversion of 4- nitro styrene oxide = (95.0-0.0)/95.0*100% ≈ 100%

*Yield of (4- nitrophenyl)acetaldehyde = 89.39/95.0*100% ≈ 94%

Entry 9



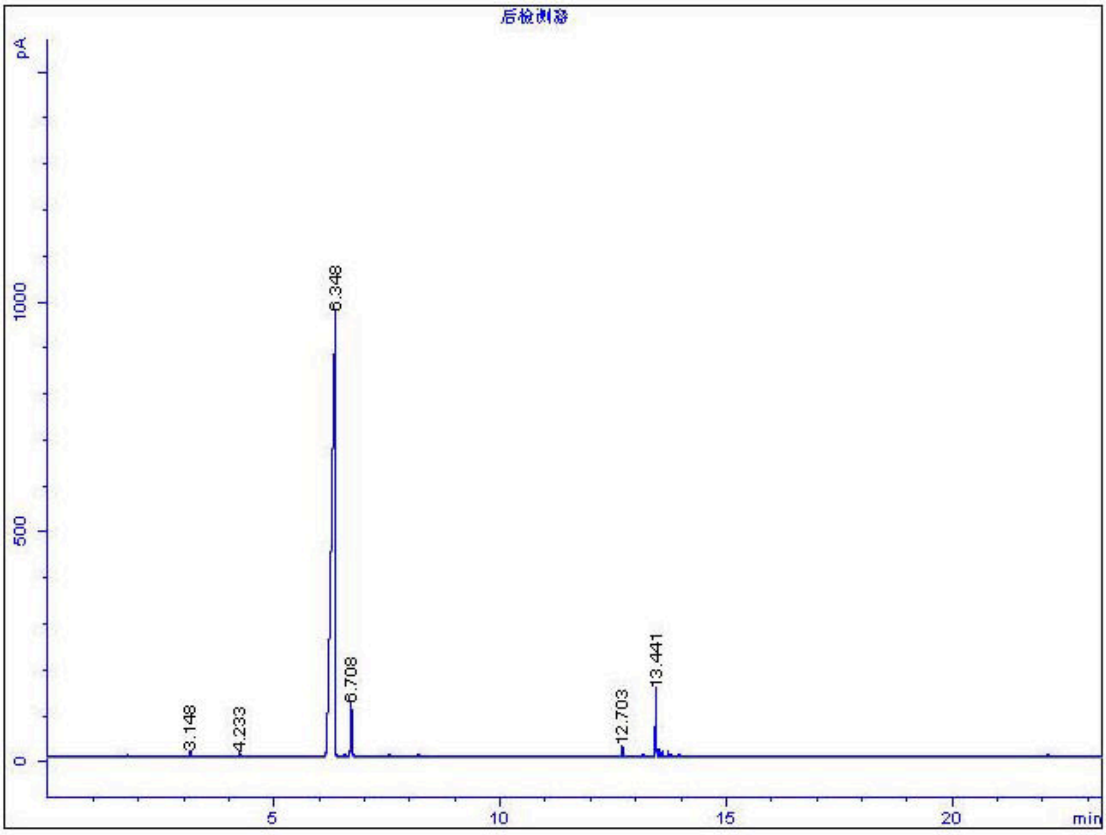
Substance	Retention times (min)	Peak width (min)	Peak area (%)	Response factor	Weight percent (wt%)
styrene	3.187	0.021	0.17	0.92	0.13
benzaldehyde	4.284	0.030	0.29	1.24	0.30
phenylacetaldehyde	6.404	0.071	90.35	1.20	91.52
styrene oxide	6.776	0.034	0.41	1.20	0.42
phenylglycol	12.689	0.019	0.14	1.20	0.14
dimer	13.415	0.021	5.89	1.04	5.17
others	-	-	2.75	1.00	2.32

*Styrene oxide in the raw material: 98.0 wt%

*Conversion of styrene oxide = (98.0-0.42)/98.0*100% ≈ 100%

*Yield of phenylacetaldehyde = 91.52/98.0*100% ≈ 93%

Entry 10



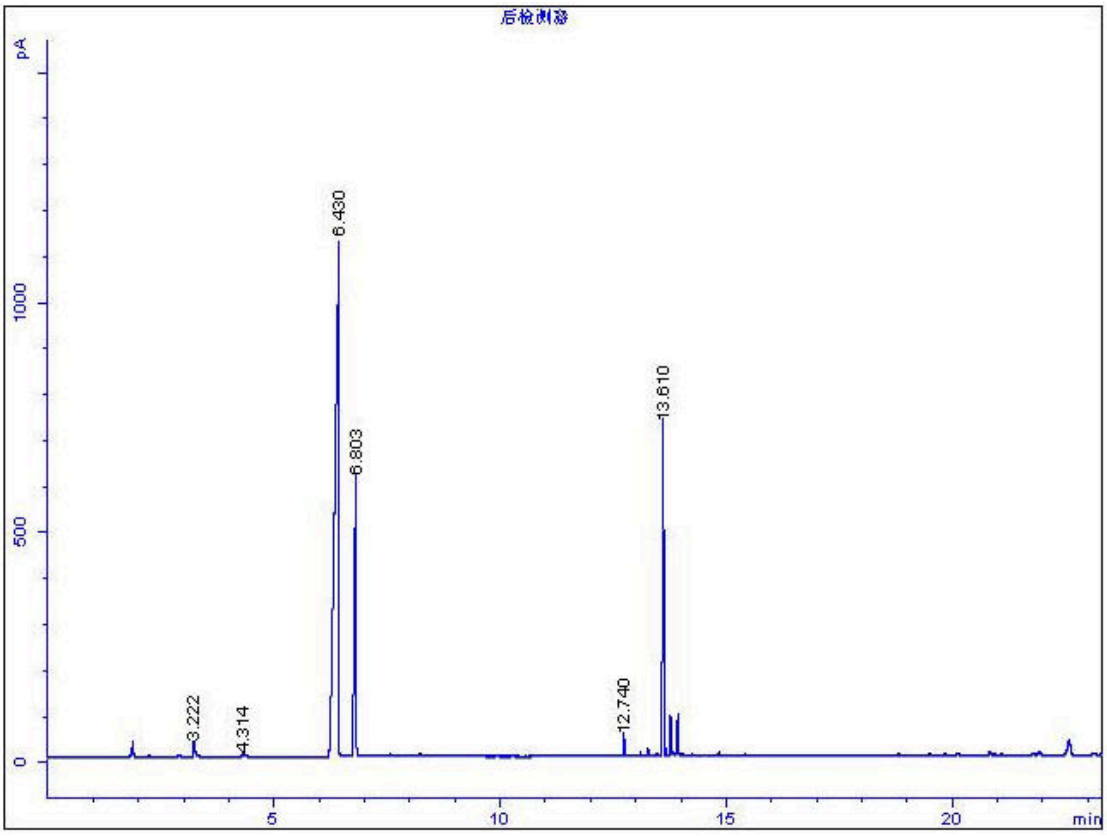
Substance	Retention times (min)	Peak width (min)	Peak area (%)	Response factor	Weight percent (wt%)
styrene	3.148	0.028	0.38	0.92	0.30
benzaldehyde	4.233	0.039	0.29	1.24	0.30
phenylacetaldehyde	6.348	0.072	87.23	1.20	88.49
styrene oxide	6.708	0.034	2.27	1.20	2.30
phenylglycol	12.703	0.018	0.43	1.20	0.44
dimer	13.441	0.022	6.80	1.04	5.98
others	-	-	2.60	1.00	2.20

*Styrene oxide in the raw material: 98.0 wt%

*Conversion of styrene oxide = (98.0-2.30)/98.0*100% ≈ 98%

*Yield of phenylacetaldehyde = 88.49/98.0*100% ≈ 90%

Entry 11



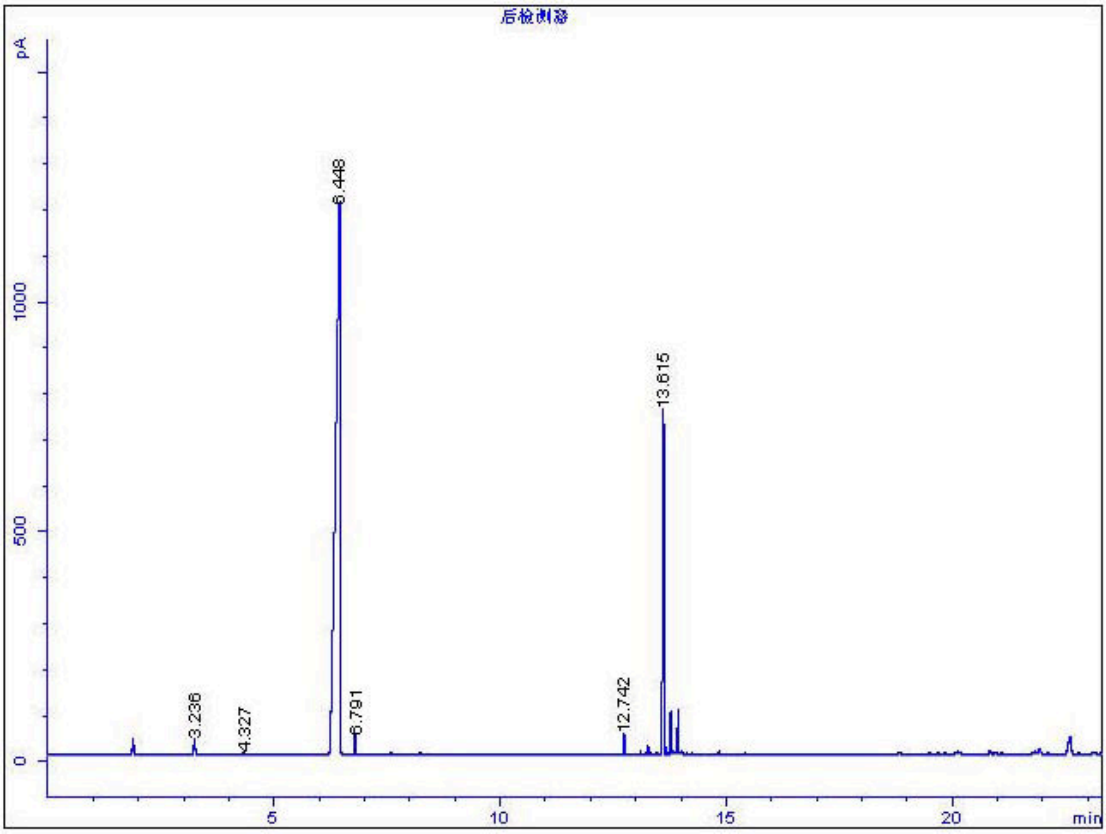
Substance	Retention times (min)	Peak width (min)	Peak area (%)	Response factor	Weight percent (wt%)
styrene	3.222	0.038	0.85	0.92	0.67
benzaldehyde	4.314	0.052	0.24	1.24	0.25
phenylacetaldehyde	6.430	0.077	59.02	1.20	60.63
styrene oxide	6.803	0.040	21.73	1.20	22.32
phenylglycol	12.740	0.019	0.58	1.20	0.60
dimer	13.610	0.031	13.77	1.04	12.26
others	-	-	3.81	1.00	3.26

*Styrene oxide in the raw material: 98.0 wt%

*Conversion of styrene oxide = (98.0-22.32)/98.0*100% ≈ 77%

*Yield of phenylacetaldehyde = 60.63/98.0*100% ≈ 62%

Entry 12



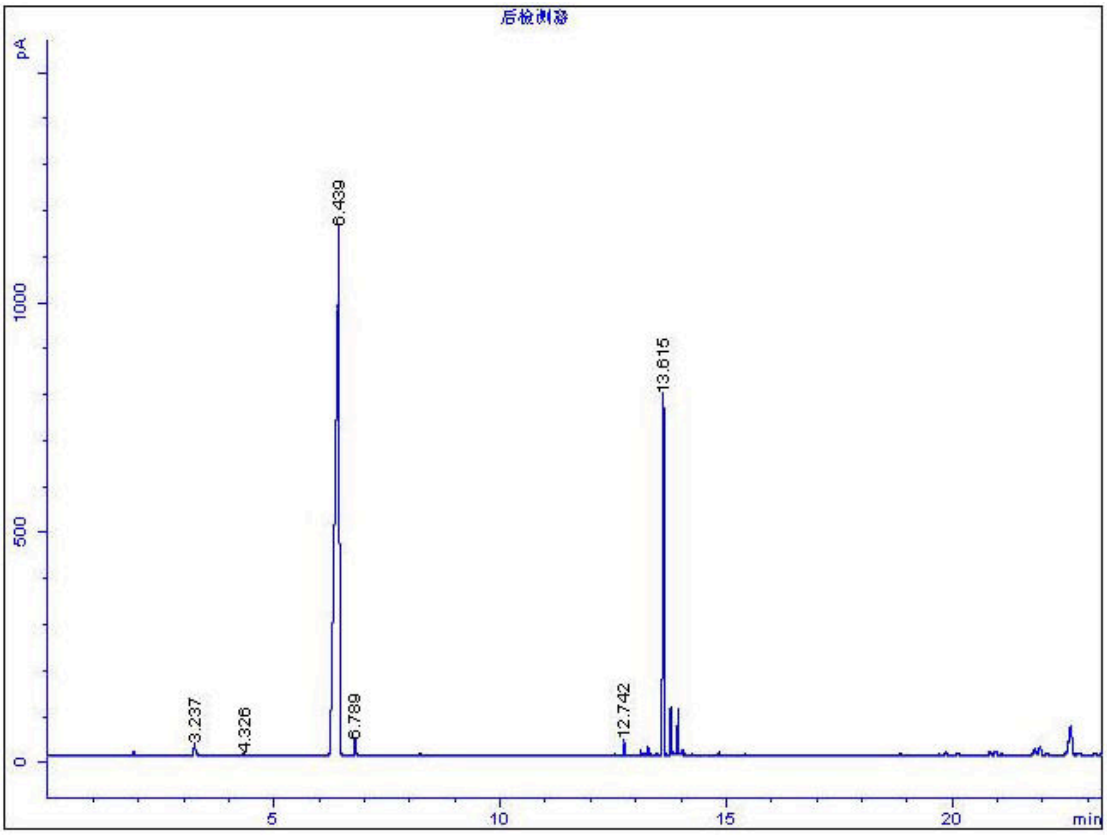
Substance	Retention times (min)	Peak width (min)	Peak area (%)	Response factor	Weight percent (wt%)
styrene	3.236	0.035	0.94	0.92	0.74
benzaldehyde	4.327	0.048	0.25	1.24	0.27
phenylacetaldehyde	6.448	0.079	72.53	1.20	74.87
styrene oxide	6.791	0.031	4.86	1.20	5.02
phenylglycol	12.742	0.020	0.60	1.20	0.62
dimer	13.615	0.028	16.62	1.04	14.87
others	-	-	4.20	1.00	3.61

*Styrene oxide in the raw material: 98.0 wt%

*Conversion of styrene oxide = (98.0-5.02)/98.0*100% ≈ 95%

*Yield of phenylacetaldehyde = 74.87/98.0*100% ≈ 76%

Entry 13



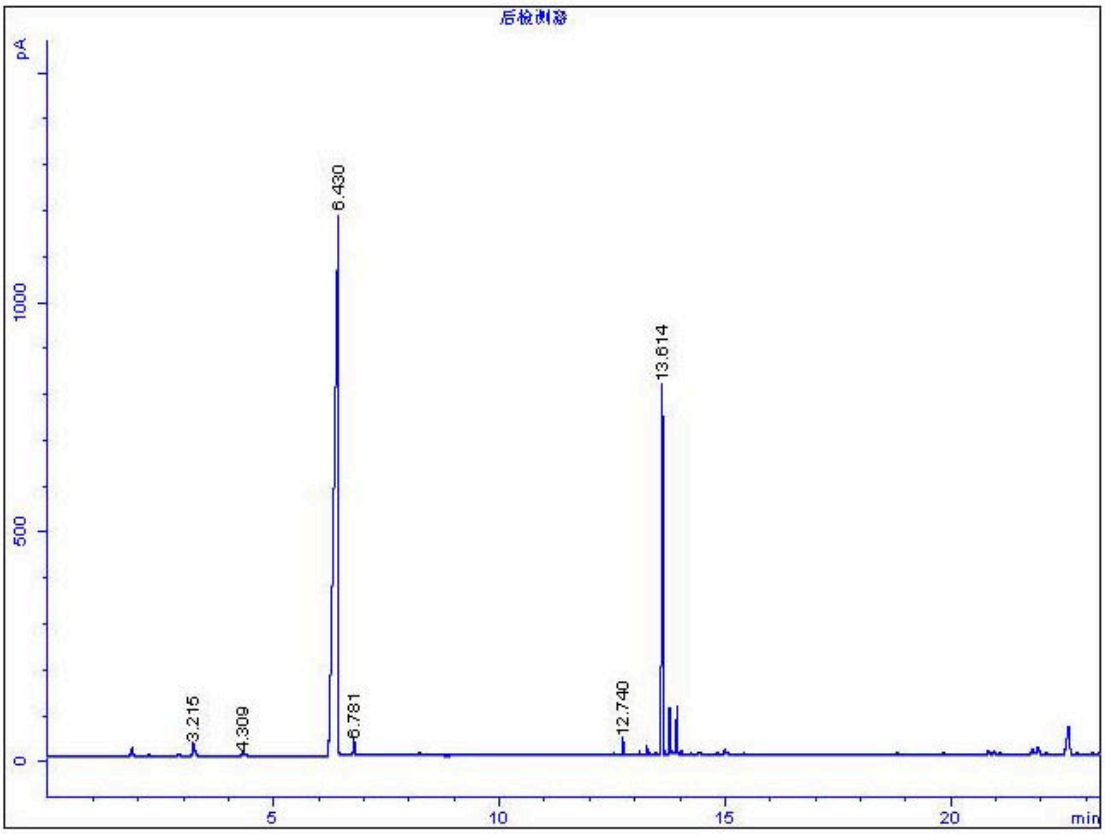
Substance	Retention times (min)	Peak width (min)	Peak area (%)	Response factor	Weight percent (wt%)
styrene	3.237	0.041	0.94	0.92	0.75
benzaldehyde	4.326	0.056	0.24	1.24	0.26
phenylacetaldehyde	6.439	0.079	75.53	1.20	78.17
styrene oxide	6.789	0.035	0.44	1.20	0.46
phenylglycol	12.742	0.020	0.46	1.20	0.48
dimer	13.615	0.030	16.99	1.04	15.24
others	-	-	5.40	1.00	4.66

*Styrene oxide in the raw material: 98.0 wt%

*Conversion of styrene oxide = (98.0-0.46)/98.0*100% ≈ 100%

*Yield of phenylacetaldehyde = 78.17/98.0*100% ≈ 80%

Entry 14



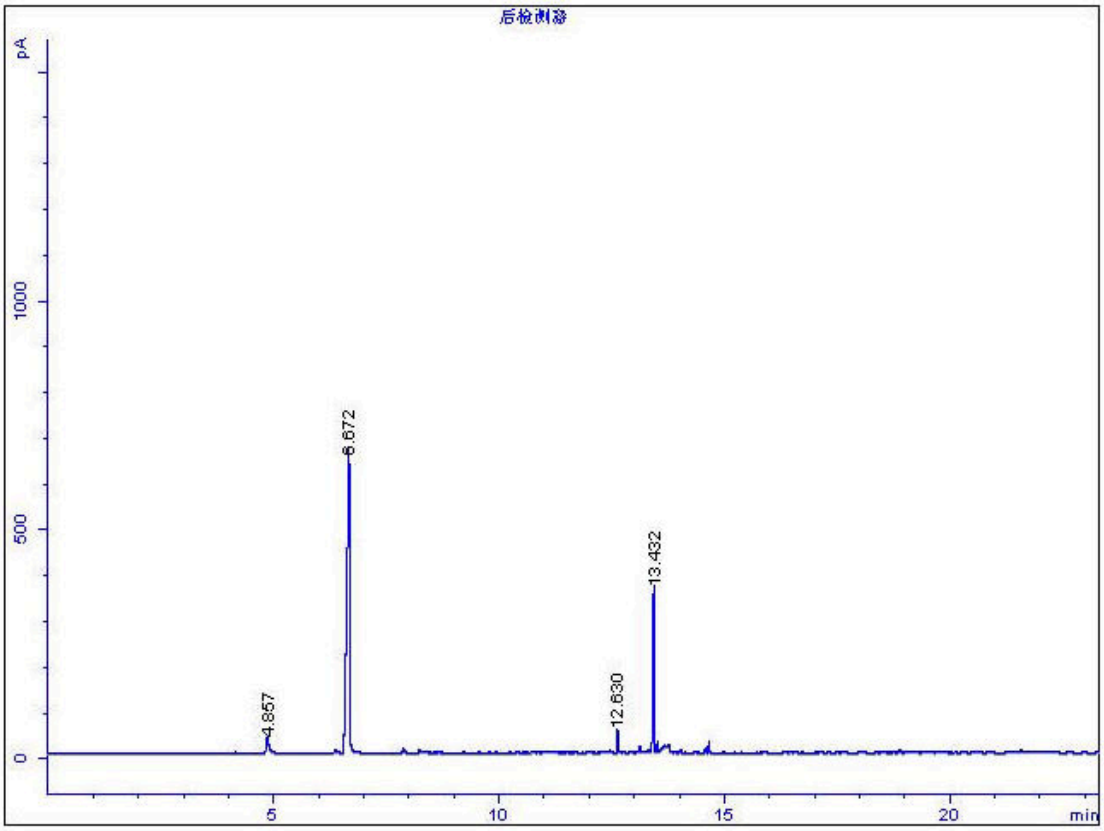
Substance	Retention times (min)	Peak width (min)	Peak area (%)	Response factor	Weight percent (wt%)
styrene	3.215	0.042	0.92	0.92	0.73
benzaldehyde	4.309	0.060	0.26	1.24	0.28
phenylacetaldehyde	6.430	0.078	74.11	1.20	76.87
styrene oxide	6.781	0.035	0.40	1.20	0.41
phenylglycol	12.740	0.021	0.53	1.20	0.55
dimer	13.614	0.030	17.34	1.04	15.59
others	-	-	6.44	1.00	5.57

*Styrene oxide in the raw material: 98.0 wt%

*Conversion of styrene oxide = (98.0-0.41)/98.0*100% ≈ 100%

*Yield of phenylacetaldehyde = 75.87/98.0*100% ≈ 78%

Entry 15



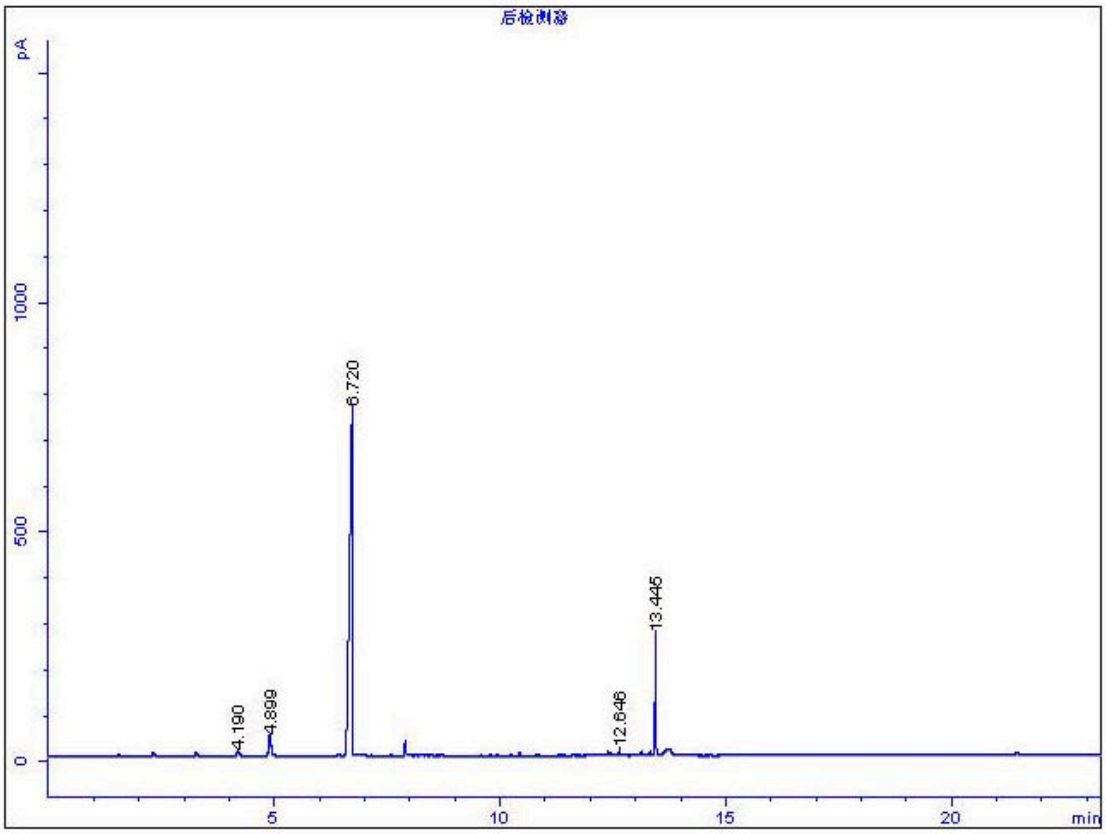
Substance	Retention times (min)	Peak width (min)	Peak area (%)	Response factor	Weight percent (wt%)
4-methyl benzaldehyde	4.857	0.062	3.98	1.24	4.26
(4-methylphenyl)acetaldehyde	6.672	0.052	68.87	1.20	71.31
(4-methylphenyl)glycol	12.630	0.022	1.96	1.20	2.03
dimer	13.432	0.028	19.37	1.04	17.38
others	-	-	5.82	1.00	5.02

*4-methyl styrene oxide in the raw material: 95.0 wt%

*Conversion of 4-methyl styrene oxide = (95.0-0.0)/95.0*100% ≈ 100%

*Yield of (4-methylphenyl)acetaldehyde = 71.31/95.0*100% ≈ 75%

Entry 16



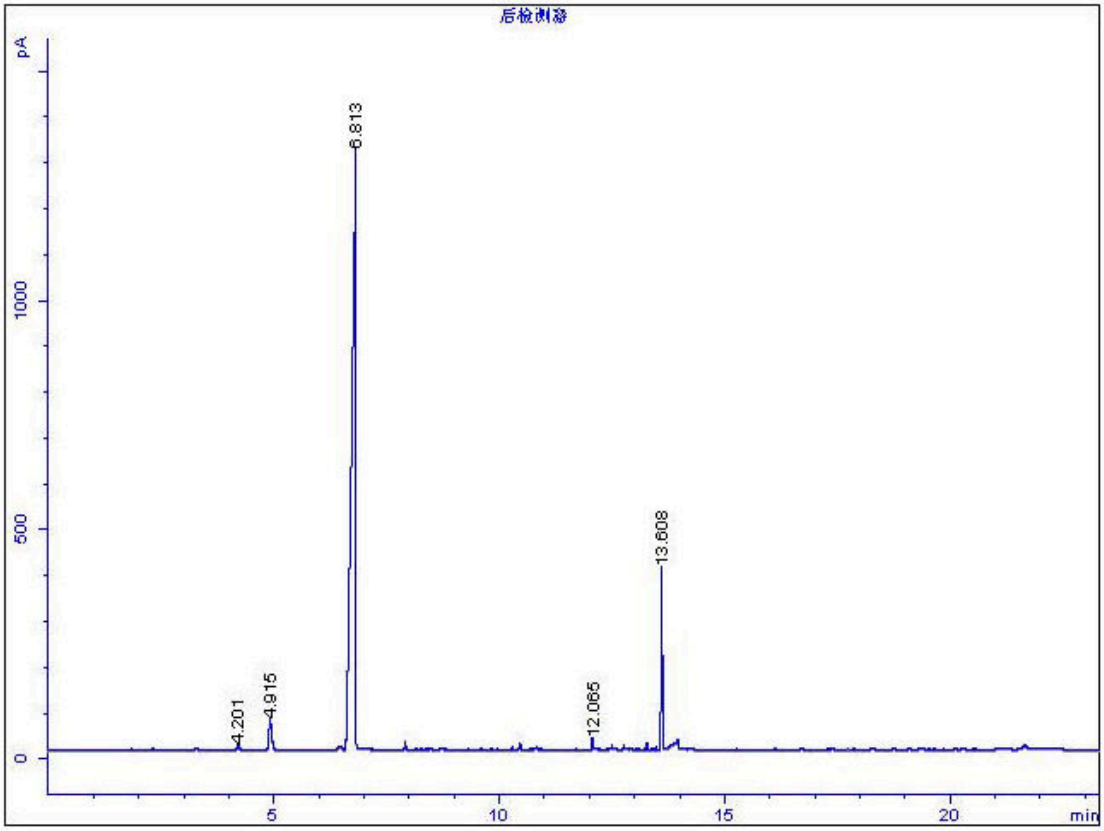
Substance	Retention times (min)	Peak width (min)	Peak area (%)	Response factor	Weight percent (wt%)
4- fluoro styrene	4.190	0.049	0.75	0.92	0.59
4- fluoro benzaldehyde	4.899	0.058	4.18	1.24	4.44
(4-fluorophenyl)acetaldehyde	6.720	0.054	75.14	1.20	77.30
(4-fluorophenyl)glycol	12.646	0.022	0.62	1.20	0.64
dimer	13.445	0.026	13.96	1.04	12.45
others	-	-	5.35	1.00	4.59

*4-fluoro styrene oxide in the raw material: 95.0 wt%

*Conversion of 4-fluoro styrene oxide = (95.0-0.0)/95.0*100% ≈ 100%

*Yield of (4-fluorophenyl)acetaldehyde = 77.30/95.0*100% ≈ 81%

Entry 17



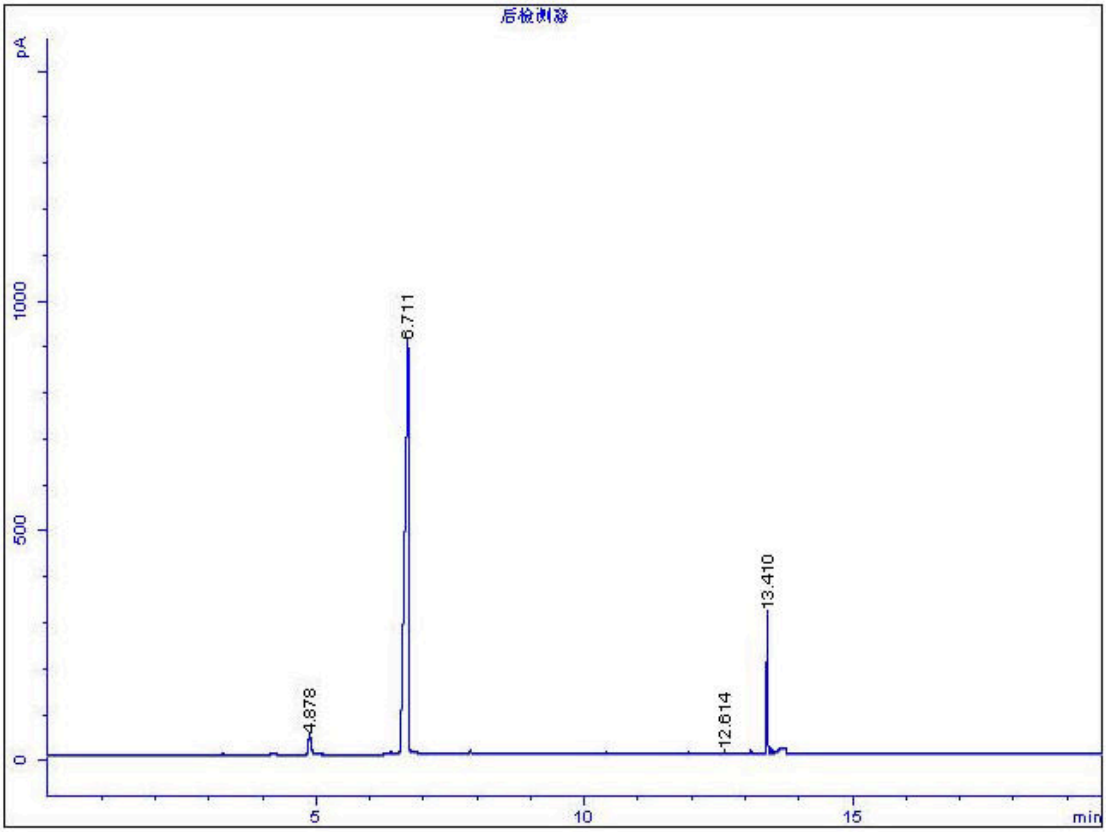
Substance	Retention times (min)	Peak width (min)	Peak area (%)	Response factor	Weight percent (wt%)
4- chlorine styrene	4.201	0.065	0.68	0.92	0.54
4- chlorine benzaldehyde	4.915	0.068	3.94	1.24	4.20
(4- chlorinephenyl)acetaldehyde	6.813	0.079	73.99	1.20	76.30
(4- chlorinephenyl)glycol	12.065	0.021	0.35	1.20	0.36
dimer	13.608	0.026	15.35	1.04	13.72
others	-	-	5.69	1.00	4.89

*4-chlorine styrene oxide in the raw material: 95.0 wt%

*Conversion of 4-chlorine styrene oxide = (95.0-0.0)/95.0*100% ≈ 100%

*Yield of (4-chlorinephenyl)acetaldehyde = 76.30/95.0*100% ≈ 80%

Entry 18



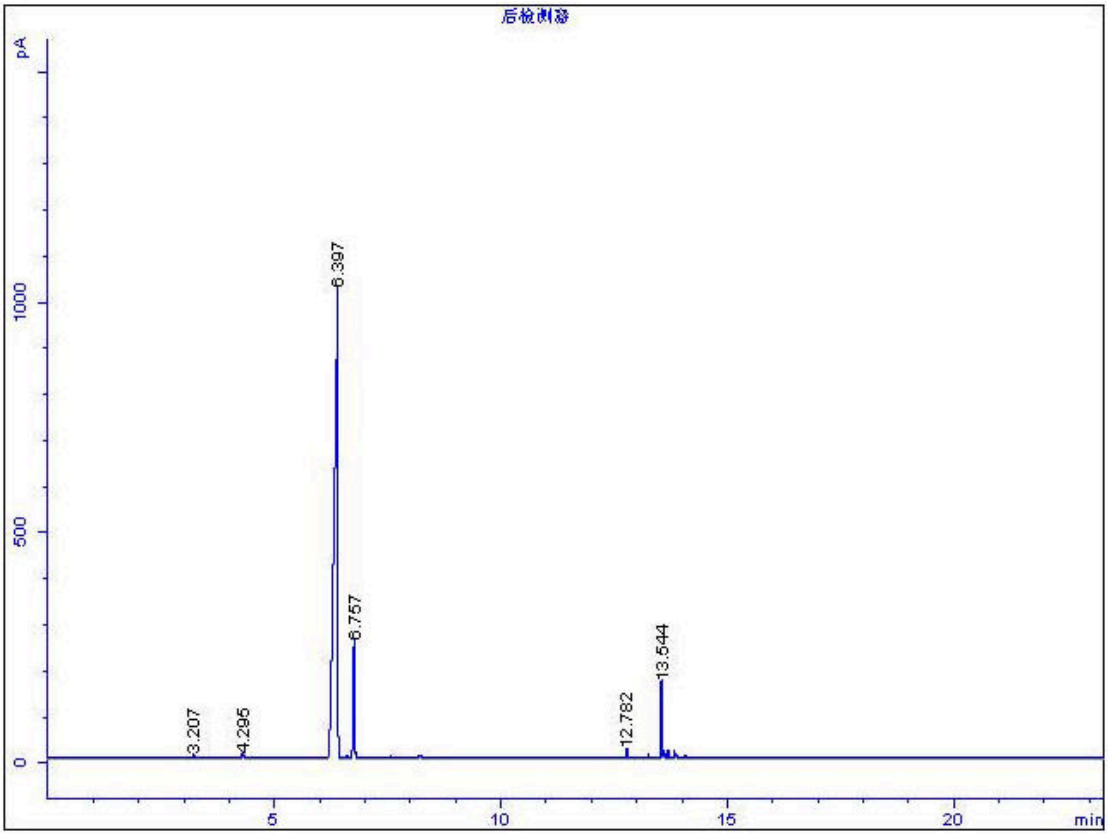
Substance	Retention times (min)	Peak width (min)	Peak area (%)	Response factor	Weight percent (wt%)
4-nitro benzaldehyde	4.878	0.055	3.22	1.24	3.42
(4-nitrophenyl)acetaldehyde	6.711	0.059	76.06	1.20	78.25
(4-nitrophenyl)glycol	12.614	0.021	0.28	1.20	0.29
dimer	13.410	0.025	15.06	1.04	13.43
others	-	-	5.38	1.00	4.61

*4-fluoro styrene oxide in the raw material: 95.0 wt%

*Conversion of 4- nitro styrene oxide = (95.0-0.0)/95.0*100% ≈ 100%

*Yield of (4- nitrophenyl)acetaldehyde = 878.25/95.0*100% ≈ 82%

Entry 19



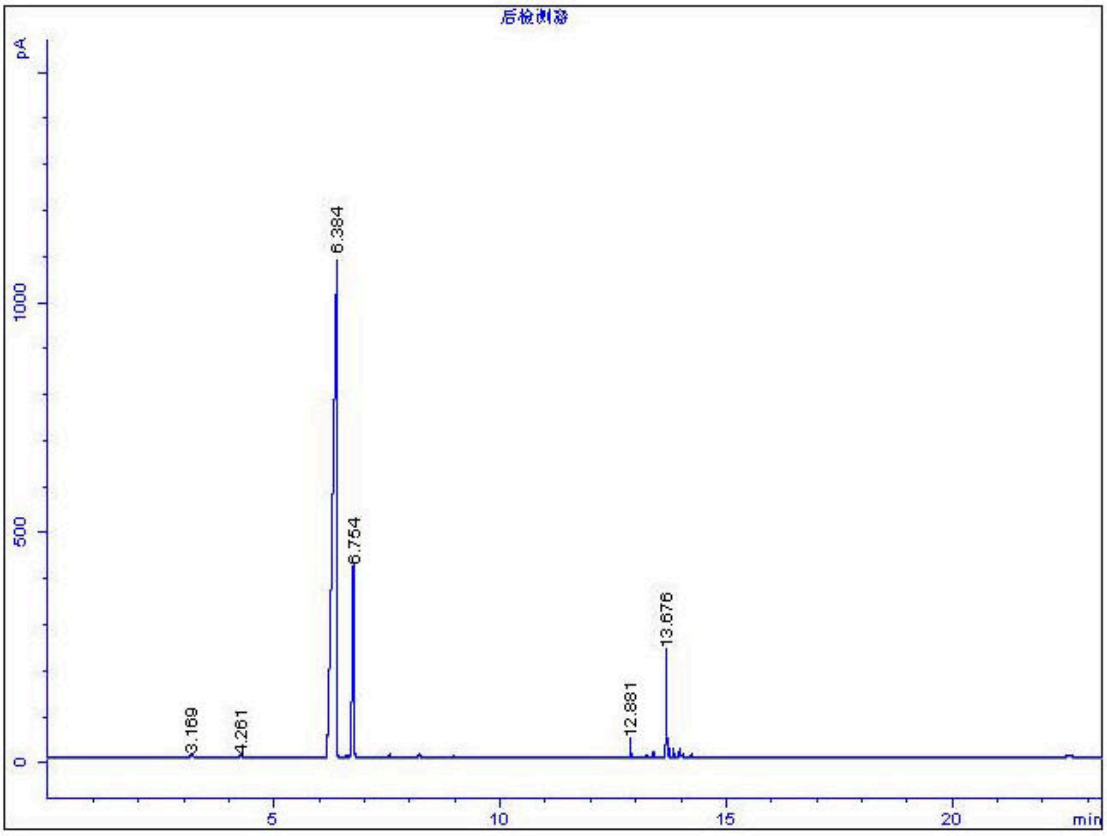
Substance	Retention times (min)	Peak width (min)	Peak area (%)	Response factor	Weight percent (wt%)
styrene	3.207	0.030	0.25	0.92	0.20
benzaldehyde	4.295	0.042	0.28	1.24	0.30
phenylacetaldehyde	6.397	0.074	73.46	1.20	75.34
styrene oxide	6.757	0.033	8.34	1.20	8.55
phenylglycol	12.782	0.020	0.35	1.20	0.36
dimer	13.544	0.022	13.37	1.04	11.88
others	-	-	3.95	1.00	3.38

*Styrene oxide in the raw material: 98.0 wt%

*Conversion of styrene oxide = (98.0-8.55)/98.0*100% ≈ 91%

*Yield of phenylacetaldehyde = 75.34/98.0*100% ≈ 77%

Entry 20



Substance	Retention times (min)	Peak width (min)	Peak area (%)	Response factor	Weight percent (wt%)
styrene	3.169	0.043	0.36	0.92	0.28
benzaldehyde	4.261	0.062	0.25	1.24	0.26
phenylacetaldehyde	6.384	0.077	63.54	1.20	64.93
styrene oxide	6.754	0.039	20.57	1.20	21.02
phenylglycol	12.881	0.019	0.62	1.20	0.63
dimer	13.676	0.021	11.45	1.04	10.14
others	-	-	3.21	1.00	2.73

*Styrene oxide in the raw material: 98.0 wt%

*Conversion of styrene oxide = (98.0-21.02)/98.0*100% ≈ 78%

*Yield of phenylacetaldehyde = 64.93/98.0*100% ≈ 66%