四 川 什 邡 市 三 高 生 化 实 业 有 限 公 司
SICHUAN SHIFANG SANGAO BIOCHEMICAL INDUSTRIAL CO., LTD.

Certificate of Analysis
(High Standard)

Name of Product		**Fmoc-Phe-OH**		
Batch No.		20230801	Manufacture Date	2023/08/26
Molecular Formula		$C_{24}H_{21}NO_4$	Molecular Weight	387.43
Test Date	2023/09/02	CAS No.	35661-40-6	Quantity: 55.0kg
Retest Date	2025/09/01			

Test Items	Standard	Test Results
Appearance	White to off-white powder	White powder
Solubility	Freely soluble in Dimethylformamide	clearly soluble
Identification by HPLC	The retention time of principal peak in the chromatogram of the test preparation corresponds to that of principal peak in the chromatogram of system suitability solution-2 from D-Isomer content by HPLC Method.	In accordance with structure
by Mass	Molecular weight of the component should be 388 ± 1 Da for $(M+H)^+$ or 410 ± 1 Da for $(M+Na)^+$ in ESI positive mode.	
Loss on drying(105℃, 3h)	≤1.0 %	0.2%
Water(K.F)	≤1.0%	0.2%
Related substances by HPLC:		
a. Fmoc-Osu	≤0.10%	Not detected
b. Fmoc-β-Ala-OH	≤0.10%	Not detected
c. Fmoc-β-Ala-Phe-OH	≤0.10%	0.02%
d. Fmoc-Phe-Phe-OH	≤0.10%	0.05%
e. Any individual unspecified impurity	≤0.20%	0.03%
f. Total impurity	≤0.50%	0.15%
Content of D-isomer (HPLC)	≤0.10%	Not detected
Assay(On dried basis)	98.0%~102.0%	99.6%
Free amino acid (TLC)	≤0.20%	Conforms
Acetate Content(IC)	≤0.02%	Conforms
Storage condition	It can be transported at ambient temperature but for long term storage, it is recommended to store below 30 degree c.	

Conclusion : Meets our standard

Director of Quality Control: **杨 坚 (Yang Jian)**

质检专用章(1)

Add.: Shuangsheng Chemical District, Shifang City 618400, Sichuan province, China.

GR No. : S0023111154
DATE : 07/11/2023

四 川 什 邡 市 三 高 生 化 实 业 有 限 公 司
SICHUAN SHIFANG SANGAO BIOCHEMICAL INDUSTRIAL CO., LTD.

Certificate of Analysis
(High Standard)

Name of Product		**Fmoc-Thr(tBu)-OH**		
Batch No.		20230601	Manufacture Date	2023/06/16
Molecular Formula		$C_{23}H_{27}NO_5$	Molecular Weight	397.48
Test Date	2023/07/06	CAS NO.	71989-35-0	Quantity: 90.0kg
Retest Date	2025/07/05			

Test Items	Standard	Test Results
Appearance	White to off-white powder	White powder
Solubility	Freely soluble in Dimethylformamide	clearly soluble
Identification by HPLC by Mass	The retention time of principal peak in the chromatogram of the test preparation corresponds to that of principal peak in the chromatogram of system suitability solution-2 from related substances by HPLC Method-II. Molecular weight of the component should be 398 ± 1 Da for $(M+H)^+$or 420 ± 1 Da for $(M+Na)^+$ in positive mode.	In accordance with structure
Loss on drying(60℃, 3h)	≤1.0 %	0.1%
Water(K.F)	≤1.0 %	0.1%
Related substances by HPLC: a. Fmoc-Osu b. Fmoc-β-Ala-OH c. Fmoc-β-Ala-Thr(tBu)-OH d. Fmoc-Thr(tBu)-Thr(tBu)-OH e. Fmoc-Thr-OH f. Fmoc-Abu-OH g. Any individual unspecified impurity h. D-Isomer i. Fmoc-L-Allo-Thr(tBu)-OH j. Fmoc-D-Allo-Thr(tBu)-OH k. Total impurity	 ≤0.10% ≤0.10% ≤0.10% ≤0.10% ≤0.10% ≤0.10% ≤0.20% ≤0.10% ≤0.10% ≤0.10% ≤0.50%	 Not detected Not detected Not detected 0.02% 0.01% 0.02% 0.05% Not detected Not detected Not detected 0.24%
Assay (On dried basis)	98.0%~102.0%	99.8%
Free amino acid (TLC)	≤0.20%	Conforms
Acetate content(IC)	≤0.02%	Conforms
Storage condition	It can be transported at ambient temperature but for long term storage, it is recommended to store below 30 degree cel.	

Conclusion : Meets our standard

Director of Quality Control: **杨 坚 (Yang Jian)** 质检专用章(1)

Add.: Shuangsheng Chemical District, Shifang City 618400, Sichuan province, China.

GR NO.: SA0231115-4
DATE : 07/11/2023

四 川 什 邡 市 三 高 生 化 实 业 有 限 公 司
SICHUAN SHIFANG SANGAO BIOCHEMICAL INDUSTRIAL CO., LTD.

Certificate of Analysis
(High Standard)

Name of Product		**Fmoc-Asp(OtBu)-OH**		
Batch No.		20230301	Manufacture Date	2023/03/17
Molecular Formula		$C_{23}H_{25}NO_6$	Molecular Weight	411.46
Test Date	2023/04/04	CAS No.	71989-14-5	Quantity: 20.0kg
Retest Date	2025/04/03			

Test Items	Standard	Test Results
Appearance	White to off-white powder	White powder
Solubility	Freely soluble in Dimethylformamide	clearly soluble
Identification by HPLC	The retention time of principal peak in the chromatogram of the test preparation corresponds to that of principal peak in the chromatogram of system suitability solution-2 from D-Isomer content by HPLC Method.	In accordance with structure
by Mass	Molecular weight of the component should comply with m/z 412 ± 1 Da for $(M+H)^+$ or m/z: 434 ± 1 Da for $(M+Nat)^+$ for in ESI positive mode.	
Loss on drying(105℃, 3h)	≤1.0 %	0.1%
Water(K.F)	≤1.0%	0.1%
Related substances by HPLC:		
a. Fmoc-Osu	≤0.10%	Not detected
b. Fmoc-β-Ala-OH	≤0.10%	Not detected
c. Fmoc-β-Ala-Asp(OtBu)-OH	≤0.10%	0.01%
d. Fmoc-Asp(OtBu)-Asp(OtBu)-OH	≤0.10%	0.01%
e. Fmoc-Asp-OtBu	≤0.10%	0.01%
f. Fmoc-Asp-OH	≤0.10%	0.03%
g. Any individual unspecified impurity	≤0.20%	0.04%
h. Total impurity	≤0.50%	0.16%
Content of D-isomer (HPLC)	≤0.10%	Not detected
Assay(On dried basis)	98.0%~102.0%	99.8%
Free amino acid (TLC)	≤0.20%	Conforms
Acetate Content(IC)	≤0.02%	Conforms
Storage condition	It can be transported at ambient temperature but for long term storage, it is recommended to store below 30 degree cel.	

Conclusion : Meets our standard

Director of Quality Control: **杨 坚 (Yang Jian)**

Add.: Shuangsheng Chemical District, Shifang City 618400, Sichuan province, China.

GR No. : S00231154
DATE : 07/11/2023

四川什邡市三高生化实业有限公司
SICHUAN SHIFANG SANGAO BIOCHEMICAL INDUSTRIAL CO., LTD.

Certificate of Analysis

(High Standard)

Name of Product		**Boc-His(Trt)-OH**		
Batch No.		20230501	Manufacture Date	2023/05/22
Molecular Formula		$C_{30}H_{31}N_3O_4$	Molecular Weight	497.6
Test Date	2023/05/29	CAS No.	32926-43-5	Quantity: 30.0kg
Retest Date	2025/05/28			

Test Items	**Standard**	**Test Results**
Appearance	White to off-white powder	White powder
Solubility	Freely soluble in Dimethylformamide	clearly soluble
Identification by HPLC By Mass	The retention time of principal peak in the chromatogram of the test preparation corresponds to that of principal peak in the chromatogram of system suitability solution-2 from D-Isomer content by HPLC Method. Molecular weight of the component should be 498 ± 1 Da for $(M+H)^+$ or 520 ± 1 Da for $(M+Na)^+$ in ESI positive mode.	In accordance with structure
Water(K.F)	≤6.5%	4.2%
Related substances by HPLC: a. H-L-His(Trt)-OH b. Boc-His-OH c. Boc-His(Trt)-His(Trt)-OH d. Any individual unspecified impurity e. Total impurity	 ≤0.10% ≤0.10% ≤0.10% ≤0.20% ≤0.50%	 Not detected Not detected 0.02% 0.07% 0.19%
Content of D-isomer (HPLC)	≤0.10%	0.06%
Assay(On dried basis)	98.0%~102.0%	99.5%
Free amino acid (TLC)	≤0.20%	Conforms
Acetate content(IC)	≤0.02%	Conforms
Storage condition	It can be transported at ambient temperature but for long term storage, it is recommended to store below 30 degree cel.	

Conclusion : Meets our standard

Director of Quality Control: 杨 坚 (Yang Jian)

Add.: Shuangsheng Chemical District, Shifang City 618400, Sichuan province, China.

GR No. : S0023111S4

DATE : 07/11/2023

四川什邡市三高生化实业有限公司
SICHUAN SHIFANG SANGAO BIOCHEMICAL INDUSTRIAL CO., LTD.

Certificate of Analysis
(High Standard)

Name of Product		**Fmoc-Glu-OtBu**		
Batch No.		20221001	Manufacture Date	2022/10/19
Molecular Formula		$C_{24}H_{27}NO_6$	Molecular Weight	425.47
Test Date	2022/10/29	CAS NO.	84793-07-7	Quantity: 15.0kg
Retest Date	2024/10/28			

Test Items	Standard	Test Results
Appearance	White to off-white powder	White powder
Solubility	Freely soluble in Dimethylformamide	clearly soluble
Identification by HPLC	The retention time of principal peak in the chromatogram of the test preparation corresponds to that of principal peak in the chromatogram of system suitability solution-2 from D-Isomer content by HPLC Method. Molecular weight of the component should be 426 ± 1 Da for $(M+H)^+$ and 448 ± 1 Da for $(M+Na)^+$ peaks in ESI positive mode.	In accordance with structure
Loss on drying(50°C, 3h)	≤1.0 %	0.05%
Water(K.F)	≤1.0%	0.1%
Related substances by HPLC: a. Fmoc-Osu b. Fmoc-β-Ala-OH c. Fmoc-β-Ala-Glu-OtBu d. Fmoc-Glu(OtBu)-OH e. Fmoc-Glu-OH f. Any individual unspecified impurity g. Total impurity	 ≤0.10% ≤0.10% ≤0.10% ≤0.10% ≤0.10% ≤0.20% ≤0.50%	 Not detected Not detected 0.01% Not detected 0.01% 0.03% 0.12%
Content of D-isomer (HPLC)	≤0.10%	Not detected
Assay(On dried basis)	98.0%~102.0%	99.9%
Free amino acid (TLC)	≤0.20%	Conforms
Acetate Content(IC)	≤0.02%	Conforms
Storage condition	It can be transported at ambient temperature but for long term storage, it is recommended to store below 30 degree cel.	

Conclusion : Meets our standard Director of Quality Control: 杨 坚 (Yang Jian)

Add.: Shuangsheng Chemical District, Shifang City 618400, Sichuan province, China.

GR No. : S0023111154
DATE : 07/11/2023