

1 **Supplementary Materials**
2 **Preparation of DNA functional phosphorescent quantum**
3 **dots and application into melamine detection in milk**

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10 **Table S1** Comparison of different methods for the determination of melamine.

Probe	Method	Linear range	Detection limit	Reference
DNA–Ag NCs ^a	Fluorescence	0.05-7 μ M	0.01 μ M	1
Ag NCs ^b	Fluorescence	0.1-30 μ M	0.03 μ M	2
Au NPs ^c	Fluorescence	0.05-0.5 μ M	0.04 μ M	3
Au NCs ^d	Fluorescence	0.5-10 μ M	0.14 μ M	4
CdTe QDs ^e	Fluorescence	0.79-9.5 μ M	0.31 μ M	5
CdS QDs	Fluorescence	2 nM-50 μ M	1 μ M	6
DNA (P ₃)	CVG-AFS ^f	1 nM-10 μ M	0.2 nM	7
DNA (P ₄)	CVG-AFS	0.1 nM-1 μ M	0.02 nM	7
T ₃₆ DNA	Visualization	0.5-100 μ M	0.08 μ M	8
-	HPLC ^g	39.6-317.2 μ M	0.79 μ M	9
-	SERS ^h	2.5-39.6 μ M	1.34 μ M	10
G-quadruplex-NMM ⁱ	Fluorescence	0.1-100 nM	0.08 nM	11
ssDNA-PQDs	Phosphorescence	0.005-6 mM	0.0016 mM	This work

11 ^aDNA–Ag NCs: Oligonucleotide-stabilized silver nanoclusters; ^bAg NCs: Ag nanoclusters; ^cAu

12 NPs: Gold nanoparticles; ^dAu NCs: BSA-stabilized gold nanoclusters; ^eQDs: Quantum dots;

13 ^fCVG-AFS: Chemical vapour generation coupled with atomic fluorescence spectrometry; ^gHPLC:

14 High performance liquid chromatography; ^hSERS: Surface enhanced raman scattering; ⁱG -

15 quadruplex-NMM: N-methyl mesoporphyrin IX (NMM) and K⁺ to form G-quadruplex-NMM

16 complex.

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18 **Table S2** Effect of co-existing substances on the RTP intensity of 20 μ M melamine.

Co-existing substance	[Co-existing substance] / [Melamine]	Change of the RTP Intensity (%)
K ⁺	150	-2.2
Na ⁺	2500	+1.7
Mg ²⁺	100	-3.3
Ca ²⁺	20	+3.4
Zn ²⁺	10	+3.9
Hg ²⁺	0.001	-5.6
Ag ⁺	0.01	-6.1
Cu ²⁺	0.01	-5.3
Pb ²⁺	0.08	+3.1
Co ²⁺	0.05	+2.1
Glc	100	-1.5
L-Ala	12	+1.9
L-Lys	5	-1.1
L-Tyr	2	+2.5
L-Glu	10	-1.1

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21 **Table S3** The results of spiked recovery test.

Sample	Added (μM)	Found (μM)	Recovery (%, n=5)	RSD (%)
Pure milk-Melamine1	10	9.8	98	4.1
Pure milk-Melamine2	50	52.6	105.2	5.7
Pure milk-Melamine3	100	98.3	98.3	3.3

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