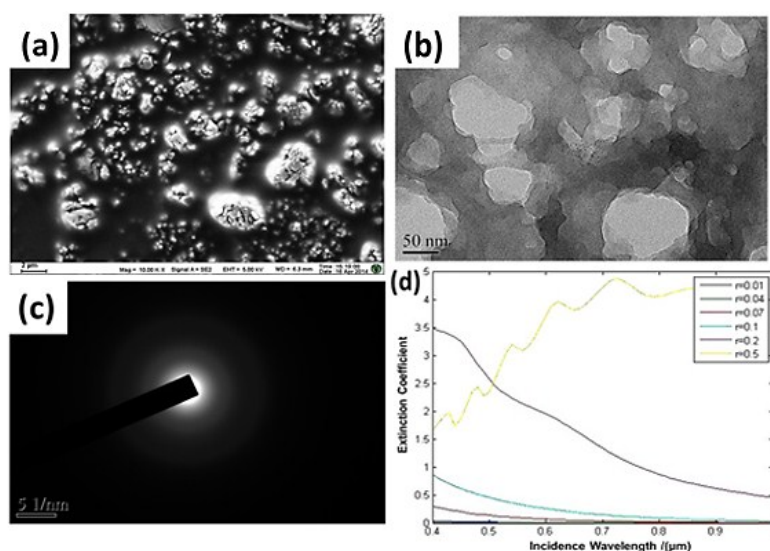


Supplemental Data

Enzyme Catalysis Enhanced Dark-field Imaging as a Novel Immunohistochemical Method

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Supplementary Figure 1. Exploration of mechanism of DAB scattering property. (a) SEM image of DAB oxidation product. (b) TEM image of DAB oxidation product. (c) Electron diffraction pattern of DAB oxidation product. (d) Relation curves of extinction coefficient and scattering wavelength of dielectric spheres of different radius with a refractive index of 1.5. (Radius unit: μm)

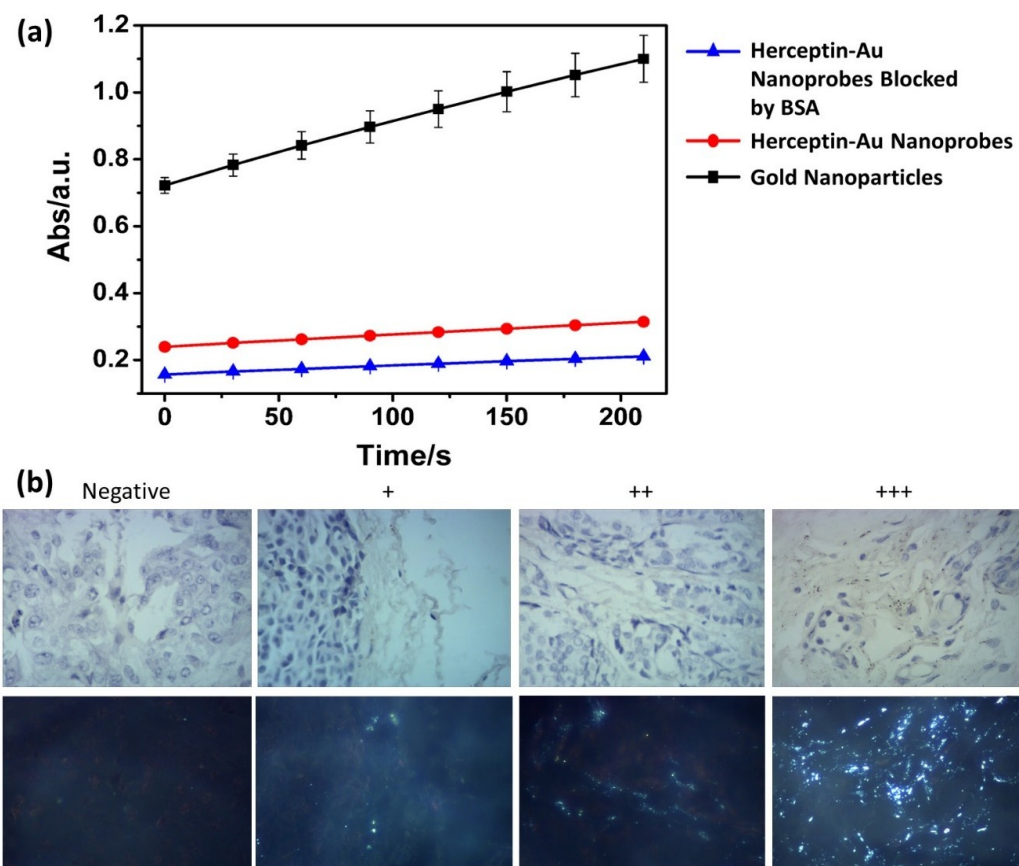
Supplementary Table 1. Results of dark-field imaging based on conventional immunohistochemical DAB staining for breast cancer sections with HER2 overexpressed.

	HER2 (+)	HER2 (-)	Total
Positive (+)	88 (a)	1 (b)	89 (a+b)
Negative (-)	3 (c)	22 (d)	25 (c+d)
Total	91 (a+c)	23 (b+d)	114 (n)

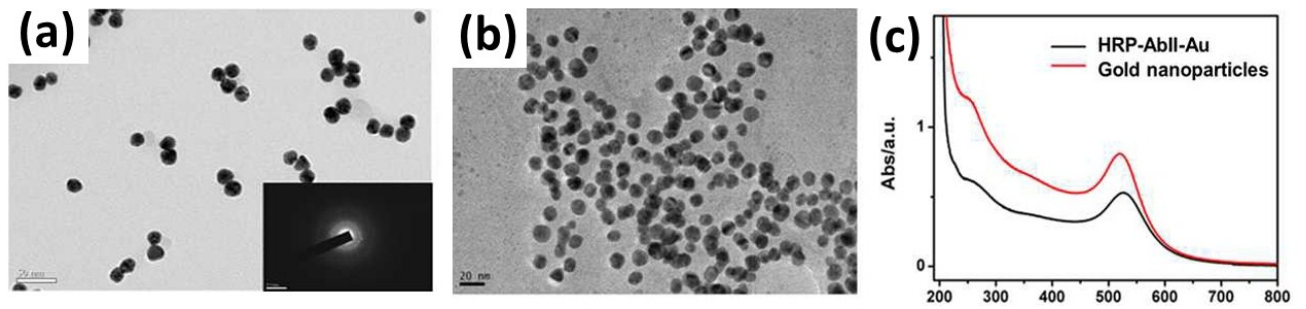
Supplementary Table 2. Results of dark-field imaging based on conventional immunohistochemical DAB staining for malignant lymphoma sections with CD20 overexpressed.

	HER2 (+)	HER2 (-)	Total
Positive (+)	32 (a)	4 (b)	36 (a+b)
Negative (-)	1 (c)	29 (d)	30 (c+d)
Total	33 (a+c)	33 (b+d)	66 (n)

Analyzed the results in Table S2, the sensitivity of dark-field imaging based on conventional immunohistochemical DAB staining for breast cancer sections was 96.97%, the specificity was 87.88%, the misdiagnosis rate was 3.03%, the missed diagnosis rate was 12.12%, the positive predictive value was 88.89%, the negative predictive value was 96.67% and the Jordan index was 0.85, which proved that the detection method and the relevant software had a satisfactory reliability and accuracy.



Supplementary Figure 2. (a) Catalytic activity of gold nanoparticles and the corresponding Herceptin-Au nanoprobes. (b) Bright and dark-field images of breast tumor sections with varying degrees of HER2 when labelled with Herceptin-Au nanoprobes which acted as peroxidase to catalyse the colour reaction of DAB



Supplementary Figure 3. Characterization of gold nanoparticles and nanoprobe. (a) TEM image and electron diffraction pattern of gold nanoparticles. The average diameter was 14.7 nm. (b) TEM image of gold nanoprobe. (c) The UV-vis absorption spectra of gold nanoprobe (HRP-AbII-Au nanoprobe) and gold nanoparticles (as control).