

The results of this experiment were corrected for such as  $\gamma$ -ray self-absorption, neutron flux attenuation, and competing reactions. The results are listed in Table 1. The quoted errors includes counting statistics, uncertainties of detector efficiency and standard cross sections.

Table 1 Results of measurement

reaction	measured cross section <sup>a</sup> (mb)	error(mb)
$^{27}\text{Al}(n, p)^{27}\text{Mg}$	72.50	1.00
$^{60}\text{Fe}(n, p)^{60}\text{Mn}$	110.70	1.90
$^{64}\text{Zn}(n, 2n)^{62}\text{Zn}$	198.30	7.70

<sup>a</sup>The cross section  $514.0 \pm 12.5$  mb of reaction  $^{63}\text{Cu}(n, 2n)^{62}\text{Cu}$  was taken as standard.

## 2. Simultaneous evaluation

Using weighted least squares method, a number of recently measured data including our experimental results (total of 39 data from 33 authors, some of which were absolutely measured by means of associated particle method) were simultaneously evaluated for five reaction cross sections at 14.6MeV:  $^{27}\text{Al}(n, \alpha)$ ,  $^{27}\text{Al}(n, p)$ ,  $^{60}\text{Fe}(n, p)$ ,  $^{63}\text{Cu}(n, 2n)$  and  $^{64}\text{Zn}(n, 2n)$ . The results are listed in Table 2.

Table 2 Results of the evaluation ( $E_n=14.6$  MeV)

reaction	evaluated cross section <sup>a</sup> (mb)	error(%)
$^{27}\text{Al}(n, \alpha)^{24}\text{Na}$	114.60	0.80
$^{60}\text{Fe}(n, p)^{60}\text{Mn}$	109.70	0.70
$^{63}\text{Cu}(n, 2n)^{62}\text{Cu}$	530.40	1.10
$^{27}\text{Al}(n, p)^{27}\text{Mg}$	72.50	1.80
$^{64}\text{Zn}(n, 2n)^{62}\text{Zn}$	194.80	2.50

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## 2.6 Progress on Measurement of Neutron Capture Cross Section

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In recent years, neutron capture cross sections of Ag, Hf and W relative to

that of Au in the energy range from 10 to 100 keV have been measured with time-of-flight method. Kinetically collimated neutrons were produced by  ${}^7\text{Li}$  (p,n)  ${}^7\text{Be}$  reaction with the pulsed 2.5MV Van de Graaff accelerator. Capture events were detected by two Moxon-Rae detectors. The resolution time of the whole system, that is, the full-width at half-maximum (FWHM) of the prompt gamma-ray peak was 1.60 ns. The total uncertainty is about 7% for most of the data points.

A detailed description of the experimental set up, block diagram of the electronics, and data analysis were given in Ref [1]. The experimental results will be published in Ref [2~4].

The Maxwellian average neutron capture cross sections of  ${}^{140}\text{--}{}^{142}\text{Ce}$ ,  ${}^{139}\text{La}$  and  ${}^{181}\text{Ta}$  relative to that of Au at  $kT=24$  keV have also been measured with the activation method. Using a pulsed 2.5MV Van de Graaff accelerator, neutrons, whose spectrum is similar to a Maxwellian energy distribution of  $KT\approx 30\text{keV}$ , were produced with  ${}^7\text{Li}$  (p,n)  ${}^7\text{Be}$  reaction. The activity of the sample irradiated were measured by a HPGe detector.

A detailed description of the experimental method, data analysis and experimental results were given in Ref [5].

#### References

- [1] Xia Yijun et al. , Chinese journal of Nuclear Physics, 10, 102 (1988)
- [2] Wang Chunhao et al. , Chinese journal of Nuclear Physics to be published, 1989
- [3] Wang Chunhao et al. , Chinese journal of Nuclear Physics to be published, 1989
- [4] Xia Yijun et al. , Chinese journal of Nuclear Physics to be published, 1989
- [5] Xia Yijun et al. , Chinese journal of Nuclear Physics to be published, 1989

## 2.7 Determination of the Average Neutron Energy Using Cross Section Ratio of the ${}^{58}\text{Ni}(n, p){}^{58}\text{Co}/{}^{58}\text{Ni}(n, 2n){}^{57}\text{Ni}$ Reactions

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The  ${}^{58}\text{Co}/{}^{57}\text{Ni}$  activation ratio of the nickel foils and the corresponding average neutron energy have been measured.